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PECOS, NEW MEXICO:
ARCHAEOLOGICAL NOTES

BY
ALFRED VINCENT KIDDER

PHILLIPS ACADEMY · ANDOVER, MASSACHUSETTS
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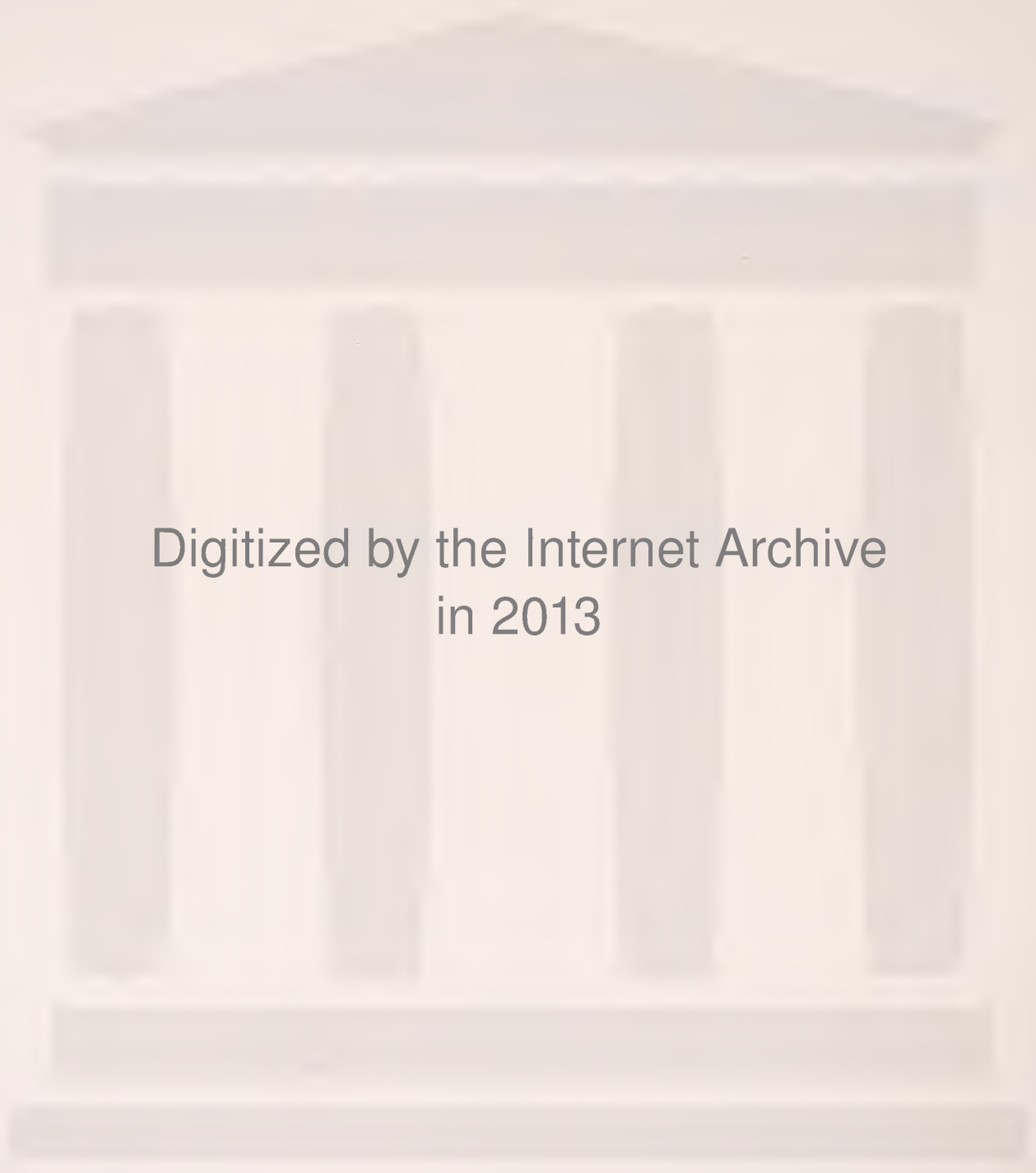
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TO NELS C. NELSON

Old and valued friend, whose stratigraphic excavations in New Mexico laid firm foundation, not only for the study of Southwestern archaeology, but for all subsequent field investigations of New World prehistory.

P R E F A C E

The archaeological work of Phillips Academy in the upper Pecos Valley was carried on between 1915 and 1929, a total of ten field seasons having been devoted to the ruins of the great Pueblo of Pecos and to various smaller, earlier sites in the vicinity. A brief description of Pecos, a summary of its history, and an account of the excavations through 1922 has been published (Kidder 1924), as well as a number of short progress reports (Kidder 1916, 1917, 1926a, b). That of 1926a carries the account of the work at the main pueblo through 1925, the last full season spent on it. The summers of 1926, 1927, and 1929 were devoted to the pre-Pecos Forked Lightning ruin and others in the valley. A study of a considerable part of the very large number of skeletons recovered was made by Dr. E. A. Hooton (1930); the pottery has been described (Kidder and Kidder 1917; Kidder and Amsden 1931; Kidder and Shepard 1936), as well as all other types of artifacts (Kidder 1932). Related researches were carried out by Dr. Elsie Clews Parsons (1925) on the ethnology of the Pueblo of Jemez, where the sadly reduced remnant of the once large population of Pecos took refuge in 1838; and by Dr. C. E. Guthe (1925) on pottery making at the modern Pueblo of San Ildefonso.

I had, of course, intended to prepare a final report on the Pecos excavations, but in 1929 I joined the staff of the Carnegie Institution of Washington for work in the Maya field and although by courtesy of Dr. J. C. Merriam, then President of the Institution, I was allowed to devote a considerable share of my time during the next few years to the monographs on the pottery and other artifacts, increasing duties of the new position prevented writing up in detail the architecture of the main Pecos ruin, the burials found there, and the excavations carried on in certain older sites in the upper Pecos valley. I shall never be able to report at length on these, but the original field data: notes, maps, plans, and photographs have been deposited by Phillips Academy in the Museum of New Mexico at Santa Fe. Skeletal material and skeleton cards are in the Peabody Museum, Cambridge. The archaeological specimens are at Andover and in the Museum of New Mexico.

It seems desirable to present a few notes on the history of Pueblo occupancy of the Pecos valley, to record the work done at one of the earliest villages, to speak briefly of the Pecos ruin itself, and, because the ceremonial rooms or kivas may be of significance for comparison with similar structures of other regions and other periods, to describe such of them as were excavated.

When the Pecos project was inaugurated in 1915, very little was known of the archaeology of those parts of New Mexico drained by the upper waters of the Rio Grande and the Pecos river. Adolf F. Bandelier (1892) had located and made surface observations on a large number of ruins and had studied those of Pecos intensively (1881). Edgar L. Hewett (1906, 1909) had conducted excavations on the Pajarito Plateau; he had also published a short paper on Pecos (1904).

It was evident that the region was rich in archaeological sites, but their age relative to each other was largely a matter of conjecture, as were their cultural and chronological relations to those of other parts of the Southwest.

The admirable work of N. C. Nelson for the American Museum of Natural History in the Galisteo Basin and elsewhere in the Upper Rio Grande had proved that stratigraphic excavation of refuse deposits, with analytical study of potsherds obtained, could yield information as to sequences of ceramic types, which in turn would permit recognition of contacts between, chronological ranking, and estimates of length of occupancy of all ruins at which those types appeared (Nelson 1914, 1916). This immensely important contribution to Southwestern methodology set the pattern for all subsequent archaeological research in the area. Pecos was, indeed, chosen for investigation in preference to several other ruins that were considered, because of the presence on the surface there of fragments of all wares then known to occur in the Upper Rio Grande, as well as certain of those of the Little Colorado and from about the Hopi towns. This, of course, suggested both long occupancy and wide trade relations. Furthermore, Pecos' strategic position athwart the most favorable route between the interior of the Pueblo country and the buffalo plains, gave hope that excavation would produce imported pottery and other objects to link a sequence of stratigraphically determined phases of local culture with those of cultures both to the east and the west, thus providing the wide archaeological hookups which were so urgently needed for the preliminary blocking out of the then very imperfectly understood course of Southwestern prehistory. These expectations were in considerable measure realized.

The first season's digging proved the middens to be vastly larger and deeper than had been foreseen (Kidder 1924, Fig. 11). Furthermore, they were full of burials, valuable not only as a source of skeletal material, but also because the graves yielded, although not in profusion, complete pots of all phases but the very latest. These provided fuller information as to vessel forms and decorations than could be had from sherds. All this, plus the intriguing technical problems of stratigraphic testing in deposits laid down on surfaces at first steeply sloping but which, as time went on and the mass of refuse grew, became more and more nearly horizontal, led me to devote to them the greater part of my time and effort. So, since undertaking the present paper, I have again and again found myself wishing that I had excavated more rooms and kivas. I have also wished that I had taken fuller and clearer notes on those that I did dig. And the more than forty years that have elapsed since the work began in 1915 have not helped to make understandable certain jottings that doubtless had once been meaningful.

Neither Pecos nor any other ruin in the valley was completely excavated by us. Some of the smaller ones could, of course, have been. But I felt that my grasp of problems was not sufficiently sure, nor had field techniques been as yet well enough developed to render it wise to exhaust

any given site. From the beginning it was therefore my practice to leave untouched considerable parts of each one investigated.

The botanically meticulous will notice, I fear with displeasure, that throughout I have spoken of cedar rather than juniper. Cedar or its Spanish equivalent was always used by us and our workmen, and by the staff in all field notes. As a matter of fact, there grow in the valley at least two species of whose proper names, either English or Latin, I was and still am light-heartedly ignorant. A probably even greater taxonomic sin has been my mulish balking at ponderosa. Yellow pine it has been to me since first I came to know it on the Pajarito, just a half-century ago; to revel in its beauty, its fragrance, the sougling of the wind in its branches. To change would seem like treachery to an old friend.

Obligations incurred before, during, and since my work at Pecos have been many and great. First, was my incalculable debt to Professor R. B. Dixon and Senator Hiram Bingham, who recommended my appointment to the Trustees of Phillips Academy. Edgar L. Hewett, Director of the Museum of New Mexico, which holds title to the ruins, graciously gave permission to excavate. Throughout my long and happy connection with the Academy the Pecos project benefited from the steady support and the wise advice of Dr. James Hardy Ropes, Chairman of the Trustees' Committee on Archaeology. Charles Peabody and Warren K. Moorehead, Director and Curator respectively of the then Department of Archaeology, now the Robert S. Peabody Foundation for Archaeology, were unfailingly helpful.

It gives me great satisfaction that, along with mine, there were cut at Pecos the archaeological teeth of S. K. Lothrop, C. E. Guthe, G. C. Vaillant, C. A. Amsden, and Robert Wauchope all of whom became leaders of our profession. Mrs. Rachael Warren Barton, Jesse L. Nusbaum, Singleton P. Moorehead, Monroe and Theodore Amsden, each rendered invaluable assistance in the field. My secretary throughout, patient and skillful mender of pottery, cataloguer at Pecos and Andover of the thousands of specimens found, meticulously accurate copyist of all pottery designs, was Ida Sanford, now Mrs. Francis Chadwick. My wife charged herself at Pecos as she did in later years at Kaminaljuyu, Guatemala, with the immensely important task of caring for the daily output of potsherds. As I believe I have said elsewhere, I doubt if any other person has handled such vast numbers of pottery fragments, to say nothing of wisely judging which should be saved and which discarded.

No one ever enjoyed better technical assistance than did I, nor did anyone ever have harder working, more careful, or more interested diggers than the Pecos Valley Mexicans. Many of these men were with me from the beginning to the end of the project and several, when shown how to expose skeletons, performed that delicate task better than any member of the staff.

Going back over what I had just written, I have deleted an appalling number of "lates." Statistically, these had been correctly entered. But to me all are still as alive in memory and in grateful affection as they

were when most of us were young and each of us was working toward the common end of learning what we could of the forces that shape human destinies.

That was thirty to over forty years ago. To return to thinking and writing of Pecos after so long a time, has been a keenly nostalgic experience. But very interesting. I find that today I am concerned less with the old site's pottery than with its human problems. Were I to tackle the job again--no, come to think of it, I couldn't have got much of anywhere toward solving such problems without the knowledge of the Pecos as potters and as workers in stone and bone and shell, to which I devoted so much of my time. That, in the teens and twenties, was fundamental.

During the years at Pecos I had no expectation of ever leaving the Southwest. What I was beginning to learn from the Pecos middens would have been necessary for further progress in understanding the Pueblos and their history. Those studies were cut short by my move to the Maya country. Nevertheless, Pecos taught Vaillant and me a great deal that was of value when we found we must inaugurate "dirt archaeology" in Yucatan and Guatemala, where the shovel had never been used save to clear structures or monuments, and the potsherd was next to unknown.

I have now acquired a fresh lot of obligations. Above all, I am indebted to Douglas S. Byers, Director of the Foundation; he has freely provided me with every facility and has been endlessly patient with my snail's progress. Miss Avis Tulloch's skillful drafting speaks for itself. Mrs. Robert A. Stephanoff, Mrs. Martin Kentigian, Mrs. James L. Irish, and Mrs. Harry L. Walker have refused to be defeated by my hashed and rehashed copy.

Pecos being a New Mexican site, I have called for, and always received, much aid from many western friends. The Honorable Boaz Long, Director of the Museum of New Mexico, has allowed the members of his staff to give time to answering my continual requests for information. Most constantly bothered, but invariably most cheerfully and promptly helpful, have been Mr. Stanley A. Stubbs, Mrs. Marjorie Lambert, Mr. Bruce T. Ellis, and Dr. Fred Wendorf now of the Texas Technological College, who skillfully excavated for me Kiva 7 at Pecos. Also often bothered, but always cheerfully sharing her great knowledge of present-day Pueblo life, has been Dr. Florence Ellis of the University of New Mexico. Dr. Terah L. Smiley of the University of Arizona's Laboratory of Tree-Ring Research worked on the South Pueblo at Pecos in the summer of 1956 with Mr. Stubbs, collecting material to add to the chronological data supplied me years ago by W. S. Stallings, Jr. On the historical side I owe much to a former Carnegie Institution colleague, Miss Eleanor Adams, now Research Associate of the University of New Mexico, translator and editor of "Bishop Tameron's Visitation of New Mexico, 1760." She and Fr. Angelico Chavez, O.F.M. have recently issued their magnificent translation and scholarly annotation of Dominguez' "Missions of New Mexico, 1776."

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SITES IN THE
UPPER PECOS VALLEY

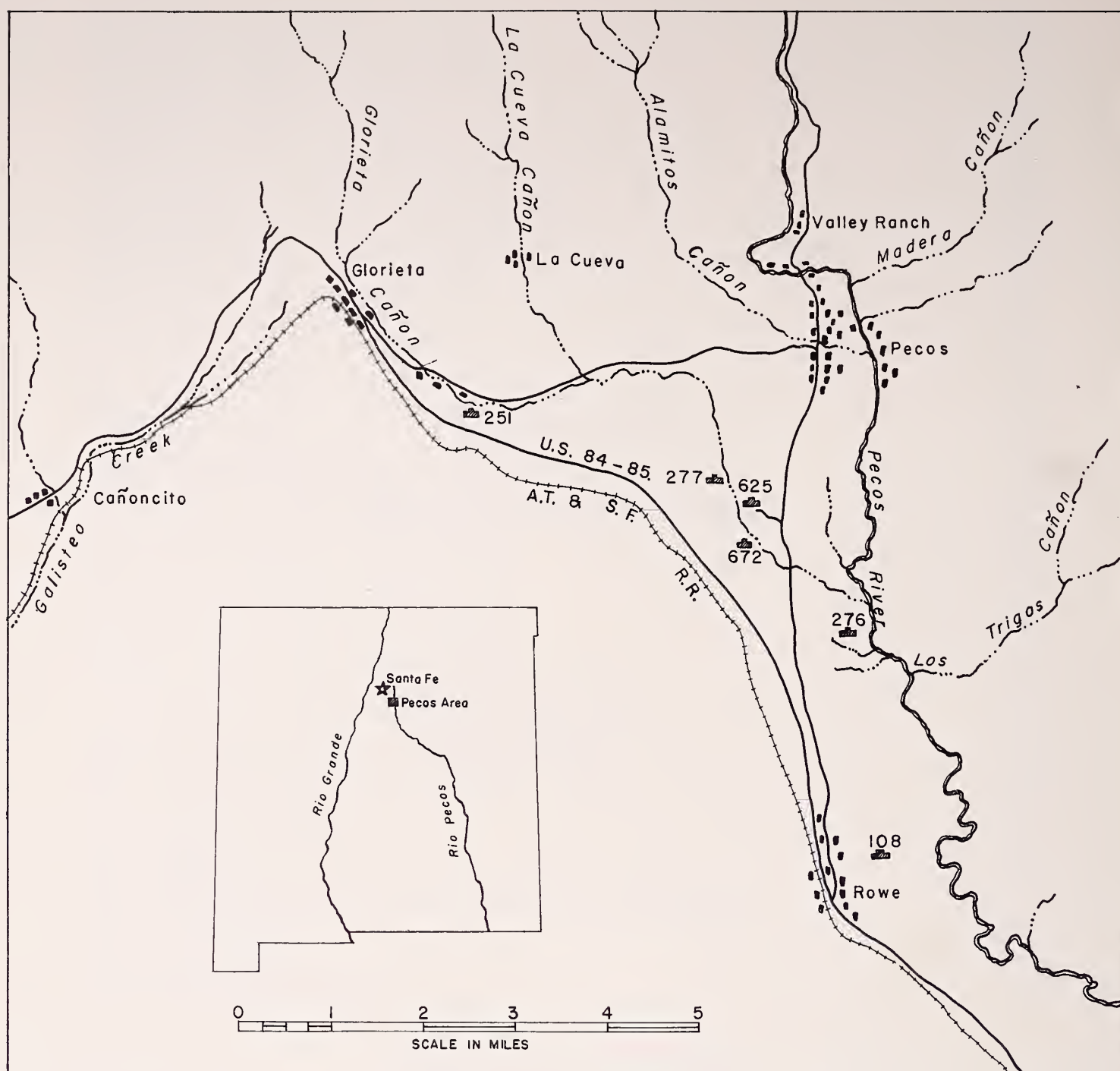


Fig. 1. Upper Pecos Valley. From New Mexico State Highway Department, County Map. Site numbers, Laboratory of Anthropology survey: LA: 108, Rowe Ruin; LA: 251, Arrowhead Ruin; LA: 276, Dick's Ruin; LA: 277, Loma Lothrop Ruin; LA: 625, Pecos Pueblo; LA: 672, Forked Lightning Ruin. Potsherds from sites in Laboratory of Anthropology, Santa Fe, and Museum of R. S. Peabody Foundation for Archaeology, Andover.

INTRODUCTION

The Pecos River rises in the Sangre de Cristo mountains and runs southward through a narrow gorge, eventually breaking out into an open upper valley that is hemmed in on the north by the lofty Sangre de Cristos, on the east by the Tecolote hills, and on the west by the red cliffs of the long Glorieta Mesa. The river is here a small perennial stream. Some five miles below its emergence from the mountains it is joined from the west by the Arroyo del Pueblo, sometimes called the Arroyo de Glorieta, that heads in the Glorieta Pass and traverses the west and northwest parts of the upper valley (Fig. 1). Normally dry, the arroyo is subject to furious floods after the violent thunderstorms of the summer rainy season; and along the rocky channel beneath its sandy bed there is a limited but seemingly constant flow of good water that can be reached almost anywhere by a little digging and that at several points comes to the surface in small springs; in fact, one of its local names is Arroyo de los Ojitos.

As was explained in an earlier publication (Kidder and Shepard 1936: 623), the Pecos project was planned at a time when so little was known of Southwestern archaeology that I believed it possible that the work might throw light on the origin of Pueblo culture. The early years of the investigation proved, however, that the Pecos region did not come to be inhabited by people of that culture until it had not only passed through its formative stages elsewhere, but was reaching, in the San Juan drainage, its highest efflorescence during the period that has been called Great Pueblo or Pueblo III.

In those days the Upper Rio Grande country was definitely peripheral to the Pueblo world; and the Pecos Valley, lying still farther east, was only just beginning to be occupied by sedentary, farming, pottery-making people. Who they were and how the first towns in the valley and in the plains to the east came to be built, is not certain. Presumably these towns were founded by immigrants from the west, but I once thought that their inhabitants might have been easterners who, working westward, had taken on the Pueblo way of life (*ibid.*: 597). In either case, their material arts were distinctly western, the houses being clusters of rectangular rooms, aligned or surrounding small courts; the decorated pottery was Black-on-white of several sorts, all obviously derived from western prototypes.

The first villages were straggling affairs on flat land open to attack from any direction, sites chosen with no eye to defense. A typical example, the Forked Lightning Ruin, part of which is described in this paper, was large and far from compact (Fig. 1).

There were towns contemporaneous with Forked Lightning farther down the Pecos and well out to the east. It was evidently a time relatively free of disturbance, and it was surely that of the maximum eastward

4 Introduction

Pueblo expansion in this part of the Southwest. But it was not destined to last. The eastern villages were abandoned, as was Forked Lightning, and on the Pecos mesilla, whose abrupt sides offered some protection from attack, a new town was established, probably by refugees from Forked Lightning. A compact, three-plaza village was also built at Rowe (Hewett 1904; Guthe 1917) on the site of an earlier, perhaps less easily defensible one. The pottery of the town on the mesilla and that of the later building at Rowe was still Black-on-white, but definitely later than that of Forked Lightning, as has been shown by Amsden and Shepard. There were other Black-on-white villages in the valley: at Loma Lothrop, northwest of Pecos on the opposite side of the Arroyo de Pecos; Dick's Ruin near the Pecos River; and Arrowhead Ruin near Glorieta. Not enough excavation was done on, nor enough pottery recovered from, this last group of sites to make certain their exact temporal relationship with the early settlements on the Pecos mesilla and at Rowe, but two of them, Loma Lothrop and Arrowhead, were the only ones that were occupied at the time when the earliest Glaze and Biscuit wares came into use. After the first Glaze period even these two were given up and from about 1400 on Pecos remained the only Pueblo town in the valley or to the east. It was now a frontier community and so remained until its final abandonment in 1838.

FORKED LIGHTNING RUIN

This, the earliest site investigated in the upper valley of the Pecos, lies on the Arroyo del Pueblo across from and about a half mile below the Pecos ruin. It fronts on the 10-foot west bank of an ancient westward bend of the arroyo, which has now straightened and somewhat deepened its channel, leaving the former bend as an amphitheatre-shaped flat (Fig. 1, LA:672; Figs. 2, 3a). The site is delimited on the north and south by minor side arroyos and is entirely open to the west, in which direction the land slopes gently upward to the red sandstone cliffs of Glorieta Mesa. Consideration of defense obviously played no part in the location of the village.

Forked Lightning was first mentioned by A. F. Bandelier and was recognized by him as a pre-Pecos site (1881:94-99). For this reason it was referred to in the field notes and preliminary reports as Bandelier Bend. The Phillips Academy party camped there from 1922 to 1929, and with a few workmen made excavations in 1926, 1927, and 1929, by permission of Mr. Tex Austin, then owner of the Forked Lightning Ranch.

Bandelier's notice was drawn to the spot by wood ash and potsherds which appear well below the present ground level in an almost continuous layer along the face of the old arroyo bank (Fig. 3b). He also found a protruding bit of masonry and a few human bones, but although he observed sherds and some building stones on the surface to the west, he no more suspected than did we, nearly forty years later, that the smooth, grassy slope, overgrown with piñon, juniper, and a scattering of yellow pine, covered the remains of a very extensive pueblo.

Following Bandelier's lead, we examined the place as part of our original reconnaissance of the upper valley in 1915. Its Black-on-white pottery, however, was not then distinguished from that of Pecos and as we believed the ruin to be an unimportant outlying example of a type which would be more adequately represented at Pecos, we did only enough digging in the bank to gather a representative series of sherds. Later, however, when we found that indented, corrugated pottery, abundant at Forked Lightning, did not occur at Pecos, we realized that Forked Lightning must be the earlier. During the building of our camp, postholes and garbage pits yielded evidence that over a large area superficial wash from higher up the slope had buried the remains of many dwellings. Excavation was accordingly begun in 1926 by following in from its exposure in the old arroyo bank the layer of ashes and sherds which long before had attracted Bandelier's attention.

We immediately discovered that this stratum underlay adobe walls, some of which actually reached the face of the bank. They were so similar in color to the surrounding earth and their exposed ends were so smoothly eroded that we had had no inkling of their presence (Fig. 3b).

The fact that the arroyo-fronting rooms were founded on rubbish



Fig. 2. Forked Lightning Ruin, East Pueblo: Masonry walls black, others coursed adobe. All doorways sealed with adobe. Circles and ovals represent firepits. Three rooms in southern section paved with sandstone slabs, floored over with adobe. Skeletons (all flexed) shown conventionally, but as oriented; adults large, infants and young children small; cross-lined lay above room floors, uncrossed below floors or in the open. Trenches, light wavy lines. Field maps of this and other parts of ruin, with room and skeleton numbers, on file at Museum of New Mexico.

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naturally indicated that an older settlement must have existed on the higher ground to the west. On the other hand, burials well above the floors of these same rooms proved them to have been abandoned while other parts of the pueblo were still in use.

We thus learned in a few days digging that the site was not a simple one. Subsequent work was devoted to an attempt to determine the limits of its many buildings and to establish their relative ages. In this we never succeeded, because no walls showed on the surface and the terrain was so open that the ancients had been under little necessity to build upon the ruins of older structures. When a series of rooms had outlived its usefulness, new ones were erected on unencumbered ground. There were accordingly, few cases of direct superposition and the ruins were so extensive and so straggling that it was impossible to clear them completely.

Had the pottery of Forked Lightning undergone marked changes resulting in development of a sequence of readily distinguishable types, our task would have been comparatively easy, for there were enough odds and ends of stratification--walls over rubbish, rubbish against houses, dumps of rubbish in abandoned rooms, etc.--to have permitted determination of the sequence of such types. This, in turn, would have served to place the structures in proper chronological order. But the Black-on-white wares were then so little known and, from beginning to end, were so much alike that ceramic groups were not recognized in the field. And while close analysis of surface features of the pottery by Mr. Amsden revealed significant differences which were confirmed by Miss Shepard's subsequent technological examination, both these studies were made after excavation had ceased. Hence, during the digging, we lacked the aid of those ceramic chronological indicators so invaluable to us at Pecos and to Stubbs and Stallings (1953) at Pindi.

Samples of pottery were taken from different parts of the ruin, from above and below floors, and from the few places where the usual thin skim of rubbish--there were no definite middens--deepened sufficiently to offer promise of stratigraphic results. These materials were brought to Andover, but there was never opportunity for Miss Shepard to subject them to the detailed technological scrutiny, nor for Mr. Amsden or me to make the studies of design which could have yielded the typological evidence they contain. Nor, because they were collected blindly, so to speak, is it probable that they could with sufficient precision now be correlated with the field notes and sections to produce reliable results. Much could doubtless be learned from the Andover sherds, but further excavation, conducted in the light of knowledge of the early Rio Grande wares since gained by Stanley Stubbs and others, would be a surer and less costly method of solving the ceramic problems of Forked Lightning. That could still be done, for the site has been little more than scratched, and following our usual custom, we left intact certain parts even of those areas which were most thoroughly explored.

This illustrates the great importance, of which in the 20's I was not fully aware, of keeping ceramic studies, both typological and technologi-

cal, abreast of excavation. Indeed, because the results of such study are so indispensable for effective digging, and because of the relative slowness, particularly of technological research, I believe that it should become established practice to devote the first season at any site that is to be extensively excavated to exploratory trenching and pitting for collection of adequate pottery samples; and that no further work should be done until that material has undergone intensive analysis.

To return to Forked Lightning, the plan (Fig. 2) covers only a small part of the site. Other sheets are in the files at Santa Fe. We started clearing, room by room, the first discovered East Pueblo. We soon realized that it was too large for complete excavation, but refuse under its floors indicated that there must be earlier structures, while refuse and burials in some of its rooms showed that there were later ones. We therefore trenched around its western periphery and, working to the west, came upon a second, older pueblo. We did considerable clearing of this, finding that parts of it had been built over by an extension of a third. We ended up by running long exploratory trenches and digging isolated pits in a desperate effort to get at least an idea of the full extent of the remains. Even this, however, was not entirely accomplished, for considerable parts of the area were never tapped; and on somewhat higher ground several hundred yards to the west were surface indications that a large group had been almost completely obliterated by erosion.

Little can therefore be said regarding the site as a whole. It evidently consisted of a number of straggling aggregations of chambers, apparently tending to surround small plazas. Each group grew by the more-or-less haphazard addition of single rooms or small series of rooms. There was no indication of large-scale, planned construction. Considerable parts of given buildings certainly fell into ruin while other sections were still in use.

From the covering of earlier refuse and the presence of burials in abandoned rooms, as well as from certain actual superpositions of walls, it is obvious that the whole village was never occupied at one time. On the other hand, there is no reason to suppose that the life of Forked Lightning was very much longer than a century. One must, therefore, postulate both a large population and a very rapid "turnover" of living quarters.

Why buildings should so briefly have been occupied is a mystery. The walls, as far as could be judged from the short butts remaining, were well laid. And while they supported, in many cases at least, the weight of a second story, there was little of the evidence so commonly found at Pecos --doubling of lower walls, buttressing, or shoring up with beams--to suggest that constructional weaknesses caused rebuilding. A fire, however, had ravaged one part of the pueblo, destroying large stores of corn. Whether or not this disaster was the work of enemies, it failed to result in abandonment of the site, for the burned rooms had subsequently been cleared, all remaining valuables had been salvaged, and the ruins either filled level with fire-hardened fragments of their upper walls, or refurbished for continued use.

Fig. 3. Forked Lightning: a, Arroyo del Pueblo (or de Glorieta) at lower right, its old loop forming the flat east of ruin. The Santa Fe trail crossed the arroyo in this area. Ruts cut by the heavy freight wagons were washed at several places into straight gullies, one of which appears a little to left of center of picture's upper edge. Photograph by Charles A. Lindbergh. Courtesy of Laboratory of Anthropology, which possesses negatives of this and other air photographs of Pecos taken by Mr. and Mrs. Lindbergh in 1929 on flights from Phillips Academy camp at Forked Lightning Ruin; b, eastern front before excavation. In the old arroyo bank appeared the layers of ash and sherds that led to discovery of the site by Bandelier. At lower right, an eroded adobe wall.



a



b



p



c



b



a

Fig. 4. Forked Lightning: a, old arroyo, 1926. Excavations showed that when Forked Lightning was occupied, during the thirteenth century, its banks were abrupt. Yellow pine, cedar, and pinyon; b, South Bank of North Arroyo, a branch of Arroyo del Pueblo, newly cut by flood from western mesa in 1927; c, group of stone-walled rooms incorporated in the adobe East Pueblo (see Fig. 2); d, East Pueblo, looking northeast across Arroyo del Pueblo to Tecolote hills. Note even erosion to ground level of all walls.

Walls

Adobe Walls. Forked Lightning was essentially an adobe village. Apparently all the earliest walls were of adobe, and the few groups of masonry rooms erected later did not set a prevailing fashion, for in several cases extensive adobe additions were built against them.

The adobe walls were uniformly of what Stubbs and Stallings have well named coursed constructions (Fig. 5a, b). Several sorts of adobe were used: soft red, harder red, charcoal-flecked red, red with many small river pebbles, and very hard gray. Charcoal-flecked red walls were by far the most common. The charcoal would seem to have been added as temper during the mixing of the adobe as was done, according to Castañeda, by the Rio Grande Pueblos of the 16th century: "They gather a great pile of twigs of thyme and sedge grass and set it afire, and when it is half coals and ashes they throw a quantity of dirt and water on it and mix it all together. They make round balls of this, which they use instead of stones after they are dry, fixing them with the same mixture which comes to be like stiff clay" (Winship 1896: 520). The Forked Lightning walls were not made of dried balls, but the preparation of the raw material may well have been the same.

Although we broke up for examination many pieces of fallen walls, we found no marks of chopped straw such as the local Mexicans now mix with their adobe, of pine needles often used for the same purpose in Guatemala, or of shredded cedar bark and other vegetable substances that served the Basketmakers for temper (Morris 1927: 159).

Red adobe with a little charcoal and a few pebbles produced the best of the Forked Lightning construction, for although clean red was somewhat harder, and clean gray much harder, both seem to have cracked rather badly on drying, while very dirty adobe was unduly soft. Excellent adobe could be had in the immediate vicinity as could river pebbles of all sizes.

Walls were built directly on the smoothed surface of the ground. There were, at Forked Lightning, no stone foundations such as underlie adobe walls of later (Biscuit B) ruins of the Chama drainage in northern New Mexico (Po-shu-ouinge ruin, Jeancon 1923: 10 and Pl. 5). We also searched in vain for evidence of foundation trenches, the presence of which we had learned to detect during our work on certain stone walls of Pecos. Still later, Mr. and Mrs. Cosgrove and I found them in connection with the coursed adobe walls of the Cloverdale ruin in Hidalgo County, New Mexico (Kidder and Cosgrove 1949).

At Forked Lightning, courses varied in height from 8 to 24 inches, the average being about 12. Each course was generally made the full length of the wall, sometimes extending the length of two or more rooms. Only very rarely was coursing carried around a corner.

The prepared adobe was evidently laid on and shaped by hand, but the work was done so quickly that little drying took place during the construction of any given course. Successive increments, whether handfuls,

basket-loads, or whatever they may have been, were therefore rarely discernible. There can be made out no lumps such as were identified by Judd in adobe walls of otherwise closely similar types at Paragonah, Utah, and by Jeançon at Po-shu-ouinge, nor any "balls" of the sort described by Casteñeda (Judd 1919: 5; Jeançon 1923:11, Pl. 6a, b. Judd 1926, passim, provides much valuable information as to the architectural use of adobe).

As the course rose, its sides were smoothed by palm-patting and finger-raking as is evidenced by many marks. The same treatment was accorded the top of the course, which was made flat or somewhat more commonly a trifle convex. The work was then allowed to dry long enough to become firm, but not sufficiently to crack. In the course of dissecting walls, we several times found evidence in the form of twig-marks and the prints of leaves that the top of a newly-made course had been covered with small boughs, presumably to prevent too-quick drying. When the fresh adobe could bear the weight, another course was added on top of it.

Walls were uniformly close to 11 inches thick. The lightest wall which we could be sure had not been thinned by erosion measured 9 inches; the heaviest, 14. These dimensions include a 1/4-inch to 1-inch finishing coat of adobe on both surfaces.

Before the wall received the finishing coat, it was evidently allowed to stand until thoroughly dry, because long vertical cracks developed. These usually ran irregularly downward, normally uninterrupted by the junctions between courses. The distance between cracks varied from 6 to 40 inches, the average spacing being about 19 inches. When walls fell, they naturally tended to break at vertical drying cracks and horizontal junctions of courses. Consequently the fragments had somewhat the appearance of large bricks, but close inspection always revealed the patted surfaces of tops of courses and the sharp, clean planes of the drying-cracks.

The dried wall finally received the above-mentioned finishing coat, which covered the cracks--although the vertical ones occasionally reopened through it--trued up all irregularities, produced rounded room corners, and was curved outward at the base to join the floor. Perhaps, indeed, plastering and flooring were done at the same time. Sizing of the fine white lime plaster which was often found on walls at Pecos only occurred in kivas at Forked Lightning.

The foregoing was written shortly after the field work was done. There has now been published the admirable monograph of Stubbs and Stallings (1953) on the Pindi Ruin at Agua Fria on Santa Fe Creek, founded at about the same time as Forked Lightning but somewhat longer occupied. The walls of that site were entirely of coursed adobe. They were much like those of Forked Lightning except that they were set in foundation trenches which, in a few cases, contained a row of waterworn cobbles. I found similarly cobble-lined foundation trenches for coursed adobe walls in the few rooms I dug at Loma Lothrop, but none at Dick's Ruin. The tops of the courses seem to have been somewhat more convex than at

Fig. 5. Forked Lightning. Coursed construction in adobe walls, finishing coats removed: a, close-up of two courses to show horizontal junction line between courses, also vertical drying cracks. Lower course 13 inches wide; b, two narrow courses above a broader one, width of middle course 10 inches. c, d, e, cache-pot in Room 80: c, small cover slab flush with floor; d, cover slab removed, floor cleaned, rotted coarse grass packing about pot; e, little Black-on-white vessel contained bunch of tiny feathers, turquoise pendant, shell beads and pendants.



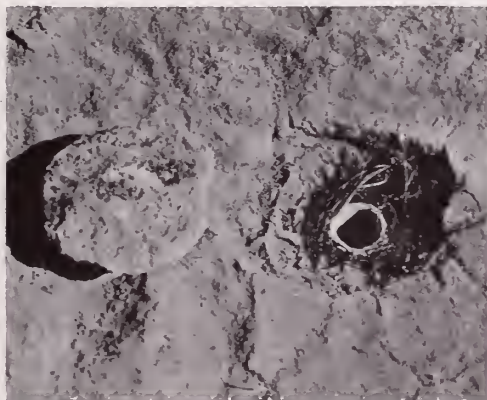
a



b



c



d



e

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Forked Lightning. An interesting feature was the occasional bonding of abutting walls by building courses crisscross from one into the other (*ibid*: Fig. 23; other types of abutments are shown in their Fig. 22). The crisscross method, if ever followed at Forked Lightning, was not noted by us.

Stone Walls. Although Forked Lightning contains very few stone walls (Fig. 2), builders of such walls were competent masons. The construction is of pieces of sandstone up to 20 inches long, more or less tabular, and with fairly straight, natural cleavages. They were evidently derived from laminated deposits and, save for such breaking as was necessary to bring them to usable size, were unworked.

The masonry is a variety of the type described by Lawrence Roys as "stones embedded between cushions of mud" (Roys in Martin 1936:128). In work of this kind, which is in principle akin to modern bricklaying, vertical contacts between stones only takes place accidentally, the weight of the wall being transmitted downward through the layers of mortar between the stones rather than from stone to stone as in dry masonry or in Roys' "dry masonry technique with voids filled with mud."

The stones of Forked Lightning masonry, save in such exceptionally good examples as that shown in Fig. 8a are not of uniform thickness, nor were the "stop-spalls" characteristic of Chaco masonry employed. There is evident, nevertheless, the feeling for coursed construction said by Roys to be characteristic of mud-cushioned work.

The average stone was longer than wide and wider than thick. Each piece was so laid that the straighter and more nearly rectangular of the two long edges should be in one of the two faces of the wall, the more irregular edge running inward (Fig. 6a). Few blocks were large enough or had edges sufficiently parallel to extend the full width of the wall and so appear in both faces (Fig. 6a, stone near centre). However, discriminating choice of materials and careful fitting permitted erection of the standard 10- to 11-inch wall with reasonably smooth faces. When a heavier wall was desired, the spaces between the ragged inner edges of the facing stones were filled with smaller pieces (Fig. 6b), but such plugging does not amount to a core of the sort seen in the massive walls of Chaco-type ruins.

As the photographs show, the work varies considerably in appearance because of the varying shapes and sizes of stones employed. But it is all of the same general nature with the exception of a single wall in the East Pueblo (Fig. 7b) which is rubble of high adobe content with small pieces of broken sandstone and waterworn boulders.

Stone walls, like those of adobe, were given a finishing coat of mud which entirely masked the masonry.

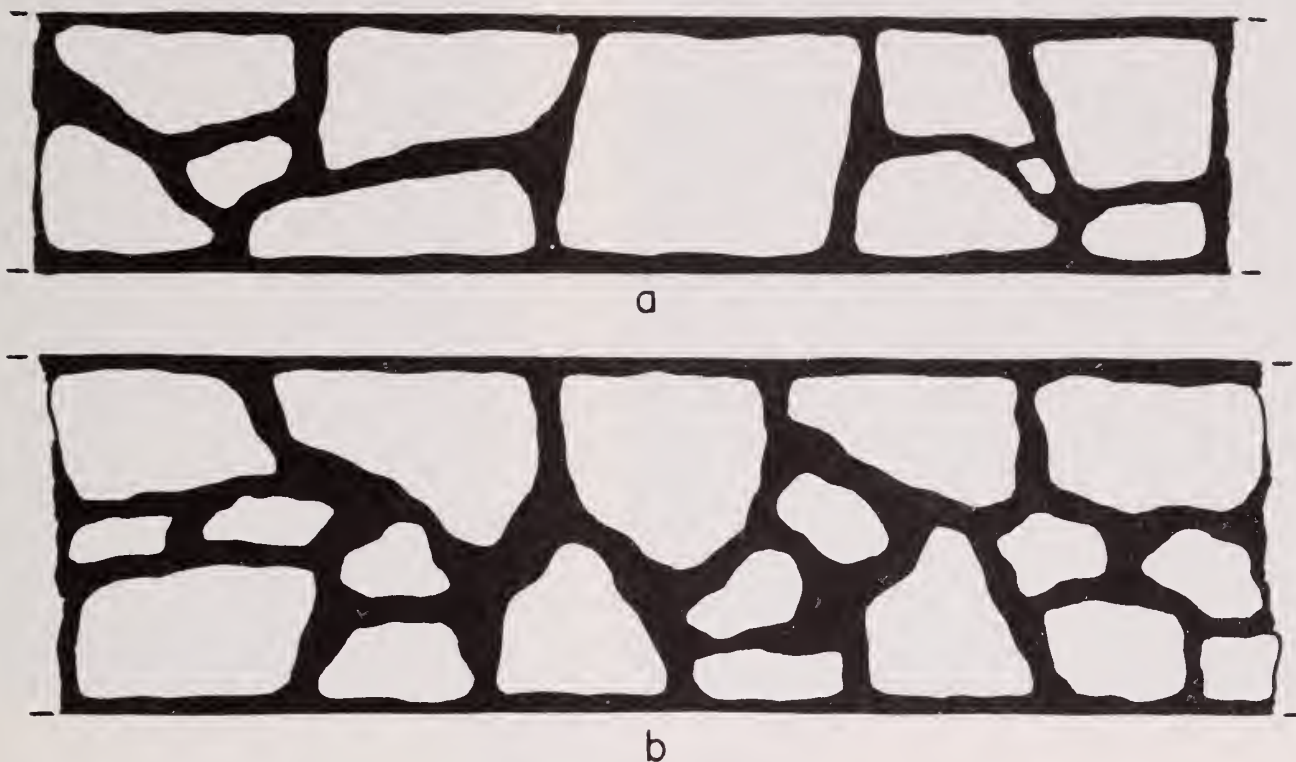


Fig. 6. Forked Lightning. Horizontal sections of stone walls: a, commoner light type, 10 to 11 inches thick. Facing stones form bulk of wall, leaving little space to be filled with adobe mortar. Seldom does single stone, as at middle, appear on both faces; b, rarer heavy type, 14 to 17 inches thick. Many small filling stones. Not to exact scale. Photos of stone walls, Figs. 4, 7, 8. Symbols used in this and other text figures, unless otherwise indicated in caption: Stones (building stone, slabs, artifacts, etc.), outlined. Bedrock, vertical hachure. Virgin clay, horizontal hachure. Puddled adobe, oblique hachure, save in coursed adobe walls, which are outlined. Mortar (adobe or clay) in masonry and finishing coats of masonry, black. Structural wood (beams, lintels, etc.), black. Ash, dots. Refuse, short wavy horizontal lines. Extent of excavation of a kiva, dashes separated by crossed short lines.



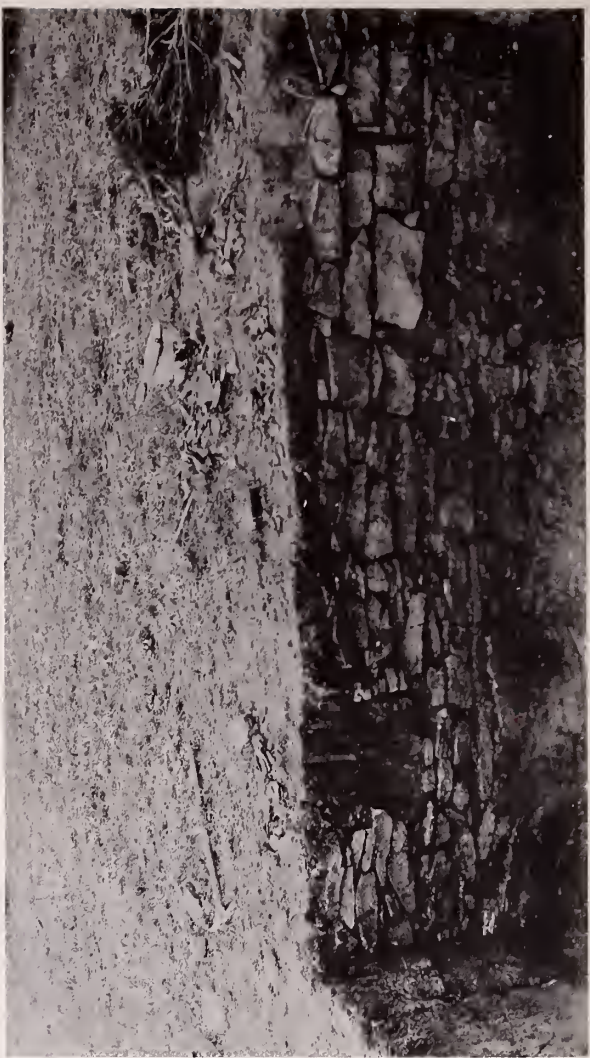
a



b



c



d

Fig. 7. Forked Lightning: a, room paved with sandstone slabs. Such paving was apparently always covered with secondary adobe floor, purpose problematical; b, East Pueblo wall of small river boulders and broken sandstone, only recorded example of such construction; c, stone wall crossing stub of older adobe wall. Floor of stone-walled room was at level of adobe wall-top; d, west wall of Square Kiva 2, patchwork masonry. At left, lower part of adobe-sealed doorway. Note entire absence of surface indication of wall or those of rooms later found further west.



a



b



c



d



e

Fig. 8. Forked Lightning: a, b, opposite sides of same wall. More even face of a due to selection of smooth-faced stones. Note base of adobe-sealed doorway with 18-inch sill-stone. Sag of wall at right of a and left of b due to compacting of refuse fill of underlying earlier room; cf. Fig. 7c. c, d, e, burials in rooms: c, on floor, Room 52, southeast corner, male, 40-45; d, northeast corner, Room 43, child, about 7, sprawled position, at first suggested massacre, but bones lay 20 inches above floor in normal room fill; e, female, about 25, southeast corner, Corner Kiva 3, 18 inches above floor. R. Wauchope.

Doors

Only ten doors were found, five in the stone-walled rooms, three of these in Square Kiva 2. Although some walls were broken off so close to the ground that they preserved no trace of doors which doors may possibly have been present, most stood not less than 3 feet high, and the average above-floor height of sills was 20 inches (extremes 15 and 24 inches). It is therefore certain that lateral openings were extremely uncommon in ground-floor rooms with adobe walls.

In width, the doors averaged 16.8 inches (extremes 13 1/2 and 19 inches). Because of wall breakage no heights could be ascertained, but one example was at least 20 inches high. All were plain rectangular openings, with sills and jambs rounded off with adobe. There was no recessing for stone door-covers. Every door found had been plugged with adobe.

Floors

Floors were 1- to 2-inch layers of clean adobe which differed so little from subsoil and from the material filling the rooms that it was very difficult, except when they were underlain by rubbish or reddened and hardened by fire, to identify them with certainty. The hard, almost polished, black floors seen in some of the later rooms at Pecos and which Jeancon (1923: 14) describes from Po-shu-ouinge on the Chama as having been made of a "mixture of ash, grease, very fine charcoal, and adobe" did not occur at Forked Lightning. We noted a few cases of finishing with a thin layer of extra-fine adobe and a very few of the laying of a second floor directly on or close above an older one. In this particular, as in many others, there was little evidence of long occupancy of any given section of the ruin.

It was evident that floors were laid after the walls had been made, for they always abutted the walls, turning up against them in a curved "hospital" junction and covering the lower ends of the drying cracks.

Floors paved with thin, unshaped sandstone slabs fitted more or less closely together occurred sparsely throughout the ruin (Figs. 2, 7a). The slabs, however, were always covered with a half-inch or so of adobe, so that the paving did not constitute a living surface. It might have been laid to protect stored corn from moisture working upward, or from burrowing animals.

Roofing

No wall stood high enough to show beam sockets and no charred timbers of burned roofs were found. In the debris thrown out in cleaning up burned rooms, however, there came to light many pieces of hard-baked

adobe bearing imprints of 4- to 9-inch beams, of twigs, of brush, of cedar and pine bark, and of slivers of split wood up to 2 inches in width, all of which indicated roofs of conventional Pueblo type (see typical Pecos roof, Fig. 30).

Firepits

From the living rooms and kivas of prehistoric pueblos, smoke was normally allowed to escape through a simple aperture in the roof. There is no evidence that chimneys or other smoke-confining or directing devices were ever used. Thus it seems that fires, either for warmth or for cooking, could normally be maintained only in chambers with unencumbered roofs. The great rarity of firepits, save in kivas, therefore indicates that Forked Lightning was largely a two-story pueblo.

The firepits in living rooms--those in kivas are described later--were simple depressions in the floor, 6 to 8 inches deep, sometimes floored, less often edged, with sandstone slabs, always rimmed with a 1- to 2-inch coping of adobe or the projecting edges of the slabs. Both round and oval pits occurred, the former averaging 18 inches in diameter, the latter 22 inches long by 14 wide. They showed signs of long use and some were still full of charcoal-flecked wood ash. That there had been many firepits in upper rooms, or on roofs, was indicated by the presence of ashes, burned slabs, and bits of the characteristic adobe copings in the debris of fallen superstructures. Movable conical clay firedogs or pot-supports were found at Forked Lightning and Rowe; also at Pindi (Stubbs and Stallings 1953:96, Pl. 16), less commonly at Pecos (Kidder 1932:144). In the just-quoted paper it is stated that there were no stratigraphic data from Pecos concerning these objects. I have since found a note that they occurred there in a burned Black-on-white phase room in the oldest part of the so-called "700 pueblo" (vide inf.). They were evidently early, perhaps exclusively so.

Artifacts

Work in stone, bone, and shell at Forked Lightning and early deposits of Pecos was much the same as that at Pindi. Arrowheads, however, which were abundant at Forked Lightning, occurred rarely at Pindi. An interesting find at the latter site was a fragment of a grooved Folsom point of silicified alibates dolomite, a stone of the Texas Panhandle. The specimen (Stubbs and Stallings 1953:97, Pl. 17x) of course dates from millenia before Pindi and, as the authors say, was doubtless picked up as a curiosity. Metates of Pindi were flat surfaced; queerly enough, there was found, as at Forked Lightning, a lone troughed metate. At neither site did there come to light a metate held at the proper angle for grinding, either by propping up with rocks or by setting it in a bin.

Stubbs and Stallings state, indeed (p. 115), that although metate bins were in use in this area at a later time, none has been recorded from any Rio Grande pueblo contemporaneous with Pindi. This question will be further considered in the section on household furnishings at Pecos.

Neither at Forked Lightning or Pindi did Glycimeris shells occur. Many were found at Pecos, most of them in Glaze I graves, one with a burial listed as probably Black-on-white. Neither at Pecos nor, so far as I know, elsewhere in the Rio Grande has there come to light a single Glycimeris bracelet, an adornment that abounds in the Gila-Salt area and on the Mimbres.

Table I

<u>Skel. No.</u>	<u>Age</u>	<u>Sex</u>	<u>Nature of offering</u>
B. B. -7	Elderly	f.	Metate over shoulder
B. B. -15	45	m.	Single <u>olivella</u> shell under chin
B. B. -18	22	m.	Ax at left elbow
B. B. -27	Inf.	?	Black-on-white ladle over ribs
B. B. -33	45	m.	St. John's Polychrome bowl inverted over chest (Kidder and Shepard 1936, Fig. 285a)
B. B. -39	Inf.	?	Black-on-white bowl, upright
B. B. -44	50	m.	Shell disc beads, <u>ca.</u> 300, at base of skull, lay as if wrapped about a queue; fragment of Black-on-white bowl inverted over pelvis; white stone tube before chest; in rotted skin sack in front of chest, two bone tubes, one perforated, red and yellow paint, many bits of low-grade, unworked turquoise, small quartz pebble; under left elbow, an ax (Kidder 1932, Fig. 24c) with traces of wooden haft; at hips, rotted skin sack containing 13 oddly shaped stones, concretions and fossils
B. B. -48	35	m.	Black bowl at head
B. B. -49	25	m.	Bracelet of shell disc beads at right wrist; bone whistle in right hand; long bone awl across pelvis
B. B. -59	25	m.	Fragmentary black bowl in lap
B. B. -60	25	f.	Fragment of large Black-on-white bowl in lap

<u>Skel. No.</u>	<u>Age</u>	<u>Sex</u>	<u>Nature of offering</u>
B. B. -61	45	m.	Fragment of large Black-on-white bowl in lap
B. B. -77	40	m.	Small corrugated jar and Black-on-white bowl on chest
B. B. -78	Inf.	?	7 tubular bone beads at pelvis
B. B. -91	19	?	Black-on-white bowl inverted over chest, <u>ca.</u> 1000, shell disc beads at pelvis
B. B. -95	25	f.	"Medicine outfit" at knees (<u>idem</u> , p. 110)
B. B. -99	18	m.	Half black jar over head
B. B. -100	40	m.	Black-on-white bowl
B. B. -105	Inf.	?	Large fragment of black jar
B. B. -107	Inf.	?	Large fragment of black jar
B. B. -109	40	m.	"Medicine outfit" of small oddly shaped stones and fossils at pelvis
B. B. -112	25	f.	Great mass of shell disc beads (<u>ca.</u> 5000) at pelvis, perhaps formerly covering an apron (<u>idem</u> , Fig. 158b)
B. B. -113	50	m.	2 Black-on-white bowls, nested, on chest (Kidder and Shepard 1936, Fig. 303)
B. B. -124	30	f.	"Medicine outfit" at hips (Kidder 1932, Fig. 158b)
B. B. -129	60	m.	18 shell disc beads and "medicine outfit" (<u>idem</u> , p. 110)
B. B. -132	Inf.	?	Fragment of black jar over head
B. B. -133	25	f.	Fragment of black jar over head
B. B. -139	50	f.	Small black jar on chest, 12 shell disc beads at pelvis
B. B. -150	Inf.	?	Turtle shell
B. B. -152	13	?	2 obsidian points in front of face

Burials

One hundred fifty-two skeletons were found during the excavations at Forked Lightning; parts of six others had been washed from the eroded bank of the arroyo. No more than at Pecos, save in historic times at the Mission, were there regular cemeteries, interments having been made all over the site. There was a strong tendency to bury in accumulations of rubbish and in abandoned, rubbish-filled rooms, usually near the corners (Fig. 8c, d, e). No certain case was noted of under-floor

burial, all graves beneath floors seeming to have been made in the open and later covered by house construction.

Mortuary customs were not elaborate. Graves whose outlines could be traced were merely oval pits two to three feet deep and just large enough to accommodate a flexed or semiflexed body which, as was proved by many observations of prints in the soil, was apparently always wrapped in twilled rush matting. There was no regularity of orientation and little in the details of position, except that burial at length, even of infants, was never practiced.

Of the 152 graves opened, the burial position of 111 bodies was noted, the 41 exceptions being infants, badly disturbed adults, and a few "floating" skulls. Flexed on the side were 51 skeletons; 30, on the left, 21 on the right. Only 13 had been buried face down, as against no less than 47 on the back. In general, Forked Lightning dead were less closely flexed than was customary at Pecos.

Burial on the back was evidently an early trait, as in Black-on-white phase graves at Pecos it was the most frequent single position, declining rapidly after Glaze I Red (see percentages in Table VII). Unfortunately, we cannot be certain of the relative cultural ages of most Forked Lightning skeletons because I was not aware, during the excavation, of the chronological differences in the local Black-on-white pottery. As a matter of fact, however, the ranking of the Forked Lightning graves would have been difficult because so few contained pottery, and, also, because of the relatively small number of superpositions and the shallowness of the middens.

Mortuary offerings, at least of imperishable nature, were very meagre. Only 30 of the 152 graves contained anything at all, and, as is shown by the accompanying tabulation, even these were poorly supplied. Indeed, it is questionable whether the large fragments of black jars so often found over the skull, particularly of infants, should not be considered parts of the grave covering rather than offerings. Adult males, it will be seen, were rather better provided than were females.

Of the 81 skeletons that could be sexed with reasonable certainty, 42 were male, 39 female. All Forked Lightning skeletons were sent to Dr. T. Wingate Todd for age determination, those in sufficiently good condition for study being then deposited in the Peabody Museum of Harvard University. These bones were recovered too late to be included in Hooton's monograph, "The Indians of Pecos" (1930). Todd's figures are given below:

Age	0-3	4-9	10-19	20-34	35-54	55	
No.	43	16	6	25	41	14	145
Percent	29.65	11.03	4.13	17.24	28.20	9.65	

Kivas

In Watson Smith's admirable paper, "Excavations in the Big Hawk Valley" (1952:161-62), he wrestles with a difficult taxonomic problem in a chapter entitled, "When is a Kiva?" Smith was dealing with structures in the San Francisco Mountain area of Arizona which is on the western periphery of the Pueblo country, as the Upper Rio Grande and Pecos are on the eastern. He makes it clear that in such regions there is "no acceptable standard by which particular rooms, either above the surface or subterranean, can certainly be identified as kivas. . . . There is not one architectural feature that is universally present in all kivas and universally absent from all non-kivas." He goes on to say, "there are many cases in which the relationships of a given room within its architectural complex, its difference in shape or size from other associated rooms, and its positional relation to them, will be of greater significance than any or all of its internal features as such."

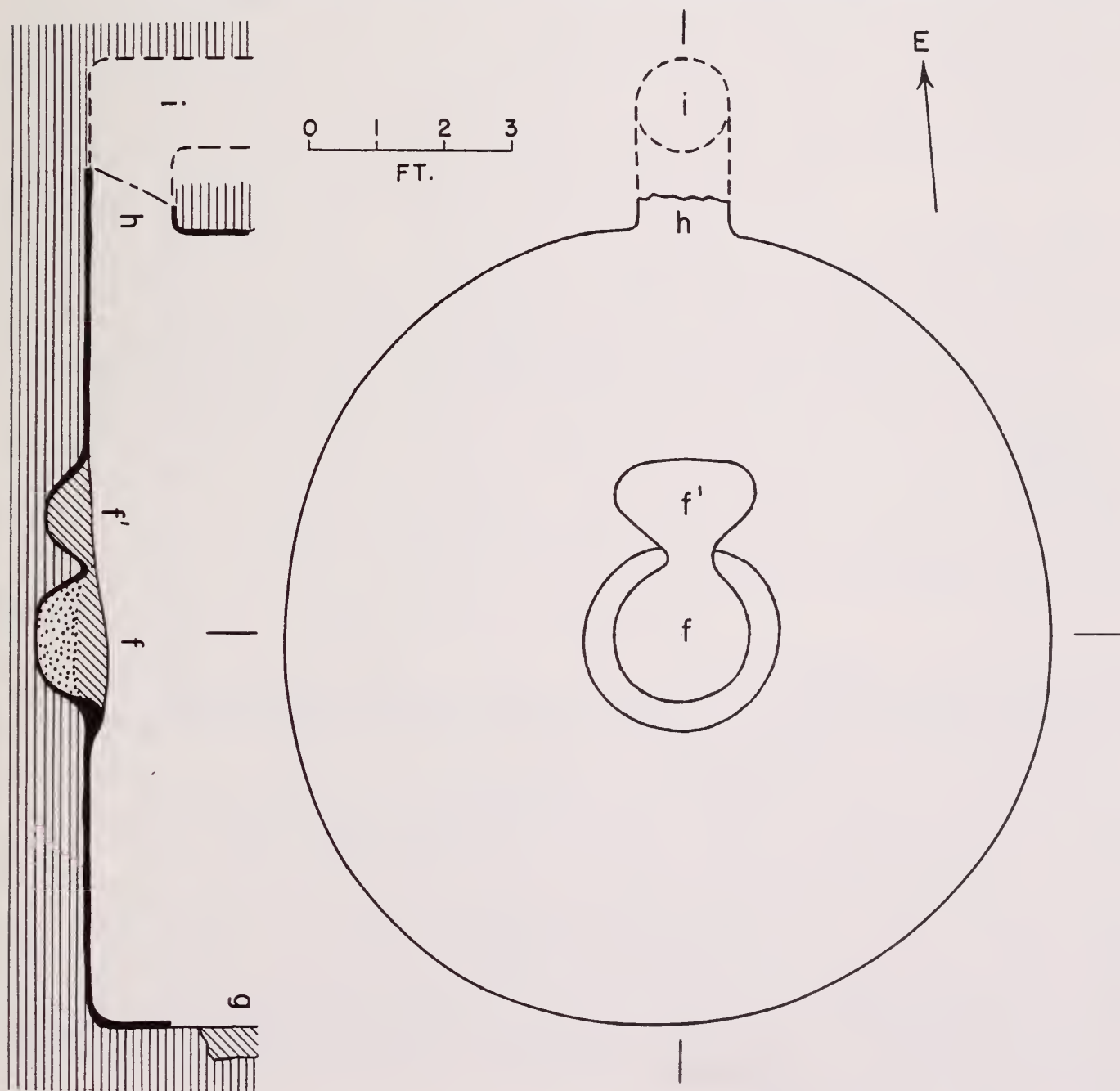
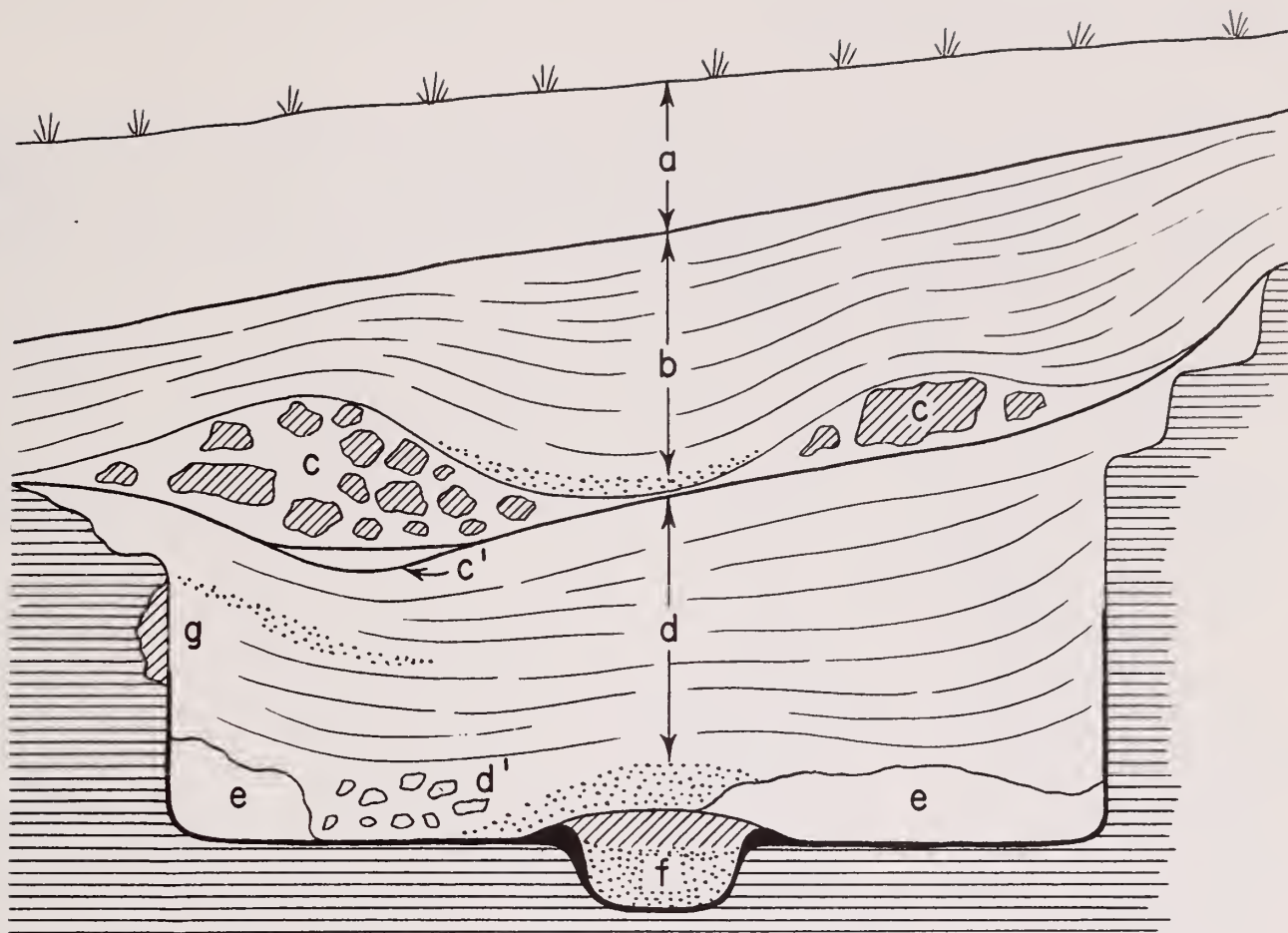
It is on this basis that I have grouped as kivas the several very unlike structures at Forked Lightning and at Pecos that have the common quality of differing markedly in one way or another from the rectangular living rooms that constitute the main mass of both pueblos.

At Forked Lightning the kivas were of two sorts: subsurface, two; and aboveground, five. The latter were also of two sorts: square, two; and with one curved wall, three. The latter I have called corner kivas.

Round Kiva A lay some 350 feet south of the southernmost rooms of the East Pueblo. There were house structures in the intervening area; they were located by test pitting, but whether they were an outlying group belonging to the East Pueblo or had formed part of an independent pueblo was not ascertained. There were apparently houses to the south and west of the kiva, but no rooms were immediately adjacent to it. Unfortunately, the arroyo had cut away all but a part of its south side, so that no ventilator or floor features remained, but there was enough of the floor to show that there had not been a four-post roof support.

The chamber had seemingly been almost entirely subsurface and about 17 feet in diameter. It had been dug into ground that sloped toward the arroyo. Wash from farther back had laid down adobe above the remaining top of the wall after the kiva had been abandoned and the upper part had collapsed inward. It was clear, however, that the pit had been cut through a layer of washed gravel, a stratum of ash with a few sherds, and on down into coarser, virgin gravel. The floor, 8 feet 1 inch below the present surface, was then laid. It was of extremely hard, beautifully smoothed, charcoal-flecked gray adobe 3 1/2 inches thick, finished with two thin coats of clean gray adobe. The wall, a 4-inch hard red adobe lining of the original pit, bore four thin coats of white lime plaster, heavily smoked. It had a slight inward batter and its upper part on the east side had a crudely laid, really piled, backing of small boulders, evidently to support the wall, which at that point had been laid against the soft upper earth.

Fig. 9. Round Kiva D (plan, sections): a, wash deposited after abandonment of pueblo; b, thin, hard-packed layers of ash and charcoal-soiled adobe, evidently a long-used living area; c, heaps of fire-hardened adobe roof and wall material with charcoal, carbonized corn, and partly calcined human bones from nearby rooms that burned some time after abandonment of kiva; c', dip in pre-fire living surface containing horizontally bedded silt deposited in standing water; d, soft, rubbishy earth with ash, fine charcoal, animal bones, and many sherds, a rapid accumulation of household refuse topped by a hard-packed living surface; d', pile of small burned river boulders with charred pine bark and twigs; probably from a barbecue pit; e, red clay from upper walls; f, firepit with adobe plug; f', ash repository; g, patchings of dark adobe in red clay walls; h, opening of ventilator; i, probable position of vertical flue, but size and distance behind east wall of kiva not determined.



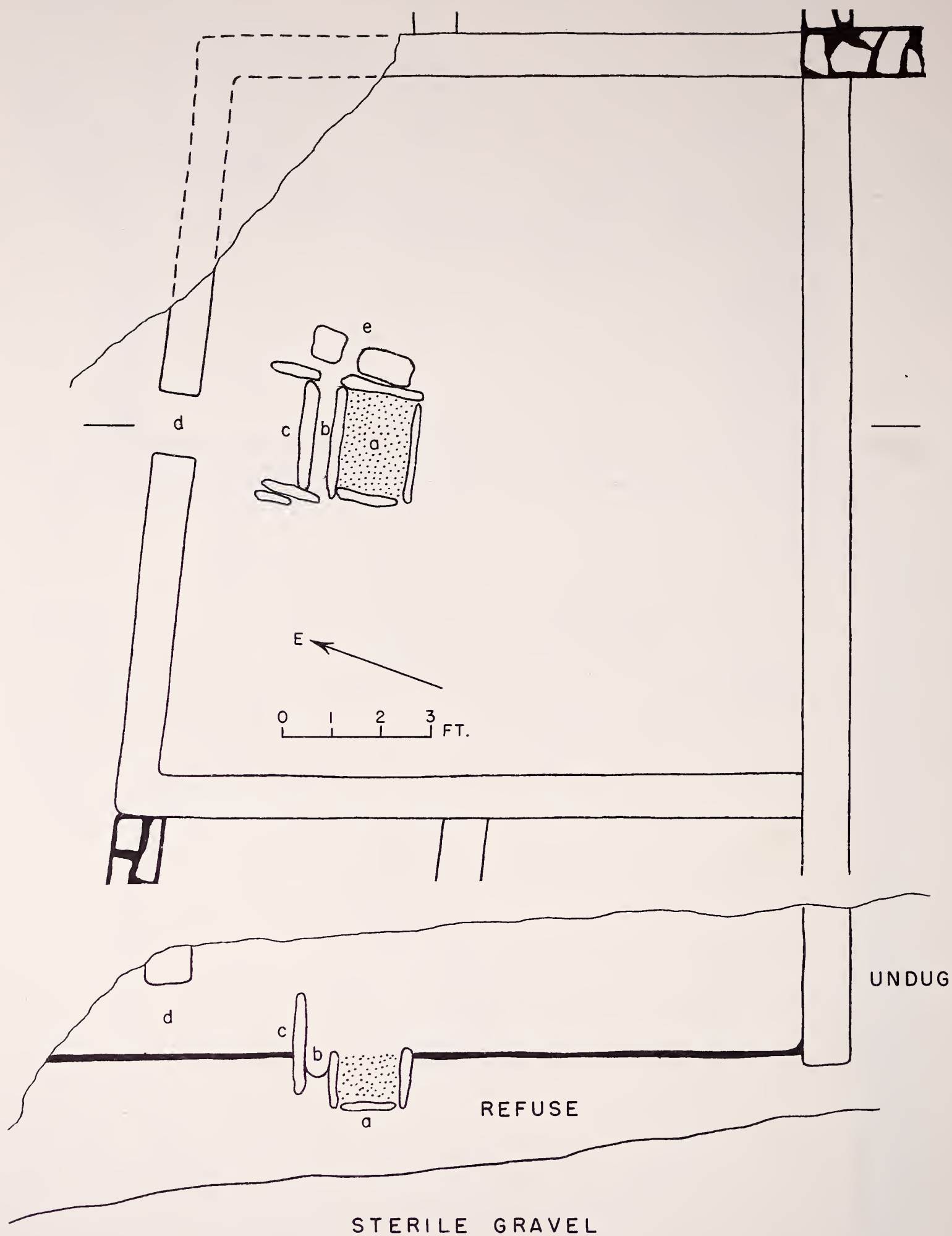


Fig. 10. Square Kiva 1, above ground, as were kivas shown in Figs. 11-18: a, firepit; b, ash pit; c, deflector; d, ventilator; e, grinding slabs. Photo. Fig. 13e.

The lower fill consisted of slabs of hard red adobe from the walls, cemented together with washed adobe. All this had been laid down shortly after the kiva had been abandoned and its roof removed. Later, the shallow basin thus formed had again and again been flooded, and many thin layers of silt had settled from standing water.

It was not possible to determine the age of this kiva. The site had certainly been occupied for some time before it was dug, as witness the ash layer. The few sherds in this, however, could not be dated.

Round Kiva D (Fig. 9) was entirely subsurface. Not quite a perfect circle, it was 11 feet 6 inches to 11 feet 8 inches in diameter and probably 8 feet deep. It had been sunk into sloping ground north of the west central part of the ruin, a group of houses that lay west of the East Pueblo and was certainly older than the latter because refuse running off this west group underlay in places the walls of the East Pueblo. No room immediately adjoined Kiva D, but close by to the south were rooms of the West Pueblo that had been ravaged by fire. The kiva had already long been abandoned and filled with dumped refuse (Fig. 9d) when burned adobe from walls and roofs (Fig. 9c) was cast into it. This adobe apparently was thrown out of the burned rooms of the West Pueblo when they were cleaned out and rebuilt. I believe this chamber to have been one of the earliest constructions at Forked Lightning, for the pottery from the lowest cuts of the stratigraphic Test D, made in its fill, is of the oldest types found at the ruin (see Amsden in Kidder and Amsden 1931:28; and Shepard in Kidder and Shepard 1936:475).

The circular pit for this kiva was dug into stiff red earth. The wall, patched here and there with dark adobe (Fig. 9g) where pieces had fallen out, bore traces of adobe (not lime) plaster. In the center of the east wall, at the level of the hard black floor, was the opening of a ventilator (h) whose vertical flue (i) presumably rose close behind the wall.

In the center of the floor was a heat-reddened firepit (f), 2 feet in diameter, full of ash. It was coped with adobe save on the east, where its edge merged with, and dipped into, an unburned pit (f') which had once been a receptacle for ashes, traces of which remained in drying-cracks in its sides and floor. The ash basin was filled and the firepit rounded over with dark adobe as if in preparation for a new floor that was never laid. There were no postholes.

Square Kiva 1 (Figs. 2, 10, 13e). Aboveground, it was built later than the living rooms to the south, earlier than those to the north. Its southeast corner had been cut away by the arroyo. All walls were of coursed adobe with traces of pinkish-white lime plaster on the lower parts. In the east wall at the level of the floor and of an evidently open space to the east, was a ventilator (Fig. 10d) 14 inches wide, 16 inches high. The floor was of red-brown adobe, 1 1/2 inches thick; a rectangular firepit (a) was edged and floored with sandstone slabs and full of white ash; the deflector slab (c) was flanked by smaller slabs at right angles; between it and firepit was depression (b), unburned and containing traces of ash. South of firepit and deflector, two well-smoothed slabs

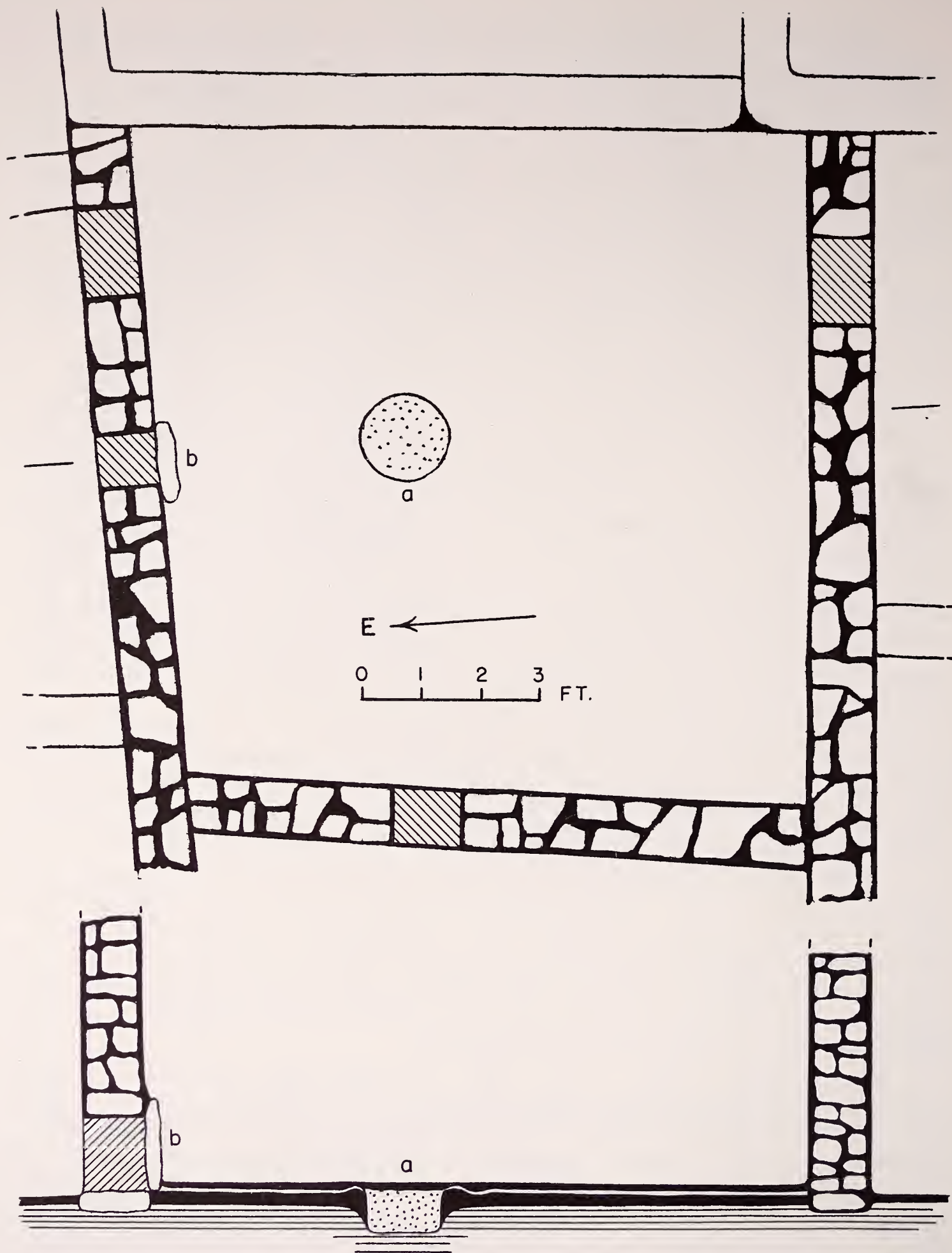


Fig. 11. Square Kiva 2, refloored for secular use: a, firepit, covered by late floor; b, stone slab held by late floor against sealed ventilator (Fig. 13d).

(e) of igneous rock set flush with the floor. Refuse from earlier rooms to the west underlay the whole chamber. Unfortunately, the floor and walls were badly damaged by rain before we could take photographs.

Square Kiva 2 (Figs. 2, 11, 13d). This aboveground chamber formed part of the stone-walled assemblage toward the north end of the East Pueblo. It differed, as did Kiva 1, from the ordinary living room in being square rather than rectangular and in having originally possessed a ventilator and firepit in an approximately central east-west axis. The north, east and west walls were of masonry, each with an adobe-sealed doorway, the sill of that in the west wall was 2 feet 3 inches, while those of the two others were 1 foot 6 inches above the floor; no doorway extended as high as the former level of a lintel. The south wall, against which the east and west walls abutted, was of coursed adobe.

There were two floors. The lower, of dark adobe 4 inches thick, surfaced with red adobe, had been laid directly on previously smoothed subsoil. In it was a round firepit (Fig. 11a) with flat bottom, vertical sides, and low adobe coping. It was burned brick red and was full of hard-packed white ash under which, in the natural gravelly subsoil, was a thin layer of charcoal. The upper floor, 3 inches thick, of very hard gray adobe, was spread directly on the lower and passed across the firepit.

A rectangular ventilator 11 inches wide and 1 foot 5 inches high had pierced the east wall. Its sill, which was on the level of the lower floor, consisted of two stones set side by side, the lintel, of a single long stone. As in Kiva 1, the ventilator passed through the wall, opening onto what, at the time of building, was an open area. Later, rooms were added against the east wall, the ventilator was sealed with hard gray adobe like that of the upper floor and was covered by a sandstone slab (Fig. 11b) somewhat larger than the opening. The slab had perhaps originally served as a removable cover or damper for the ventilator as in Kiva D at Pindi (Stubbs and Stallings 1953:39, Fig. 32), or it may have been a deflector that had been set in the lower floor. As found, it was held firmly in place by the upper floor. This floor had been removed before the photograph (Fig. 13d) was taken.

There is no doubt that this chamber had originally served as a kiva and that it had passed into secular use when the addition of rooms blocked the unobstructed opening to the east, which appears to have been a stringent ceremonial requirement. Presumably at the same time, a second story was added, as evidenced by the presence in the fill, well above the floor and among lumps of wall-adobe, of two metates, several manos, and slabs possibly from a metate bin, together with burned slabs and ashes from a firepit.

Corner Kiva 3 (Figs. 12, 13a, b). Aboveground, it was made by enclosing with a curving wall an exterior angle of the East Pueblo. All walls were of coursed adobe. A ventilator one foot square, in the east wall, at level of floor and exterior plaza, was plugged with gray adobe

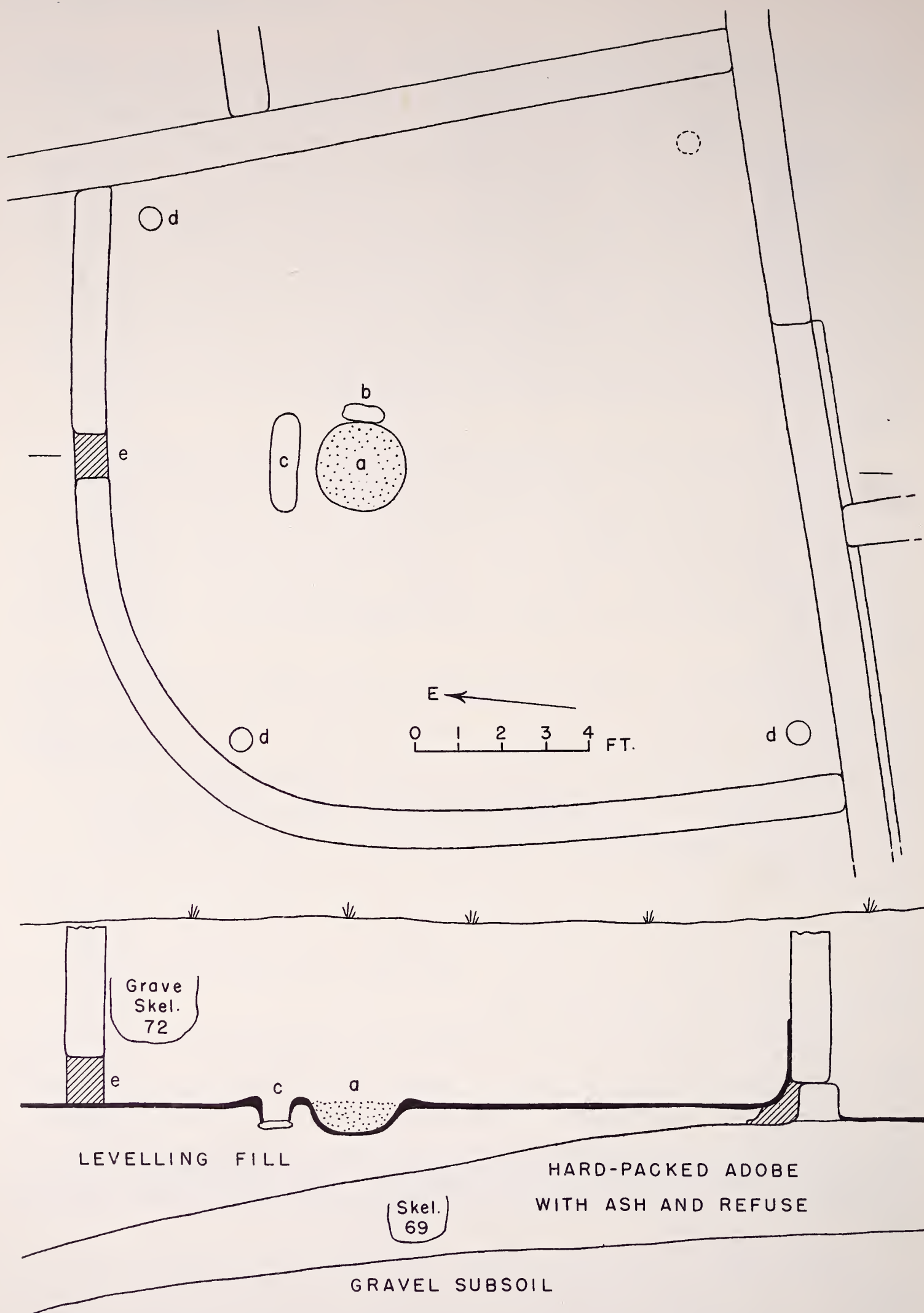


Fig. 12. Corner Kiva 3: a, firepit; b, grinding slab; c, ash pit; d, d, d, postholes; e, sealed ventilator (Fig. 13a, b).

(Fig. 12e). Remnants of single coat of pinkish-white lime plaster remained on lower parts of walls. Floor of yellow adobe was 1 inch thick; its surface, well finished, was greenish-black. Three 6-inch post holes (d), and a probable fourth in southwest corner where floor was broken, marked locations of posts which presumably aided walls in supporting main roof-beams. Firepit (a) 24 inches in diameter and 8 inches deep, had a low adobe coping, and was full of fine white ash in which were three crushed clay pot-supports (Kidder 1932:144, Fig. 127); against its south edge a smoothed, flat igneous stone (b) was set flush with floor. East of firepit was an elongated (2 feet 4 inches) oval, adobe-coped ash repository (c), floored with sandstone slab; only traces of ash remained, there was no sign of burning.

This kiva was full of fragments of adobe from the upper walls. No dumped rubbish was found, but chamber had evidently been abandoned, as an adult (Skel. 72) had been buried 18 inches above the floor (Fig. 12) and an infant (Skel. 71) against the north wall.

The kiva had been built on an artificial levelling of adobe and re-handled refuse. Below this and under the adjoining rooms was hard-packed adobe washed from further west that contained ash and refuse layers and an infant burial (Skel. 69), made prior to the levelling fill.

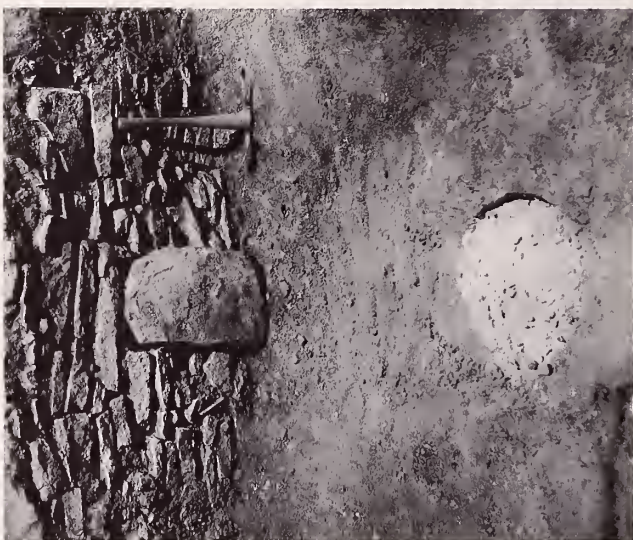
The north part of the west wall had slipped or been pushed 3 inches east at the level of the top of the lowermost course (Fig. 12). This had happened before the construction of the kiva as the wall had been strengthened and trued up with adobe prior to the laying of the floor and the plastering of the wall.

Corner Kiva 4 (Figs. 2, 14). Aboveground in the southwest edge of the East Pueblo. A shallow recent drainage had worked its way across this part of the pueblo, eroding walls including those of the kiva, to a height of 1 foot to 18 inches; the kiva floor was much broken by tree roots. The chamber had been formed by erecting a wall of coursed adobe in an exterior corner of a pre-existing building. In the east wall at floor level was a ventilator (Fig. 14e) 1 foot 5 inches wide, height uncertain, and sealed with adobe. In the floor were two pits. A large, ash-filled eastern one (a), was not heavily burned, but too much so to be thought an ash repository. Above it was a packed level (dotted line in section of pits) that may represent a secondary floor, in which case the pit may be an early fireplace. The western pit (b) was D-shaped, heavily burned, adobe-coped, ash-filled; its eastern edge was formed by a vertical sandstone slab, perhaps a low deflector. Probable postholes noted at c, d.

Corner Kiva 5 (Figs. 13c, 15). Aboveground on the east front of an apparently long (E-W) building west of a north central building that, in turn, lay west of the arroyo-fronting East Pueblo. A small chamber, it was produced by adding a roughly semicircular wall against the straight side of a building to the west. Thus it was not, strictly speaking, a corner kiva, but it was made to occupy a corner position by the addition to its south side of a living room. The pueblo, of which this kiva and the adjacent rooms formed part, fell into disrepair, was abandoned, and a



e



d



c



b



a

Fig. 13. Forked Lightning: a, Corner Kiva 3, interior. Coursed adobe walls. Note small, adobe-plugged ventilator at floor level (Fig. 12); b, same, exterior. Test pit sunk below base of wall into refuse underlying kiva. Rear (west) wall has been breached; c, pits in floor of Corner Kiva 5 (Fig. 15); d, Square Kiva 2 after removal of upper floor. Fire-pit and central part of east wall. Ventilator plugged with adobe and with slab as found (Fig. 11); e, Square Kiva 1. Firepit, slab deflector, ventilator (Fig. 10).

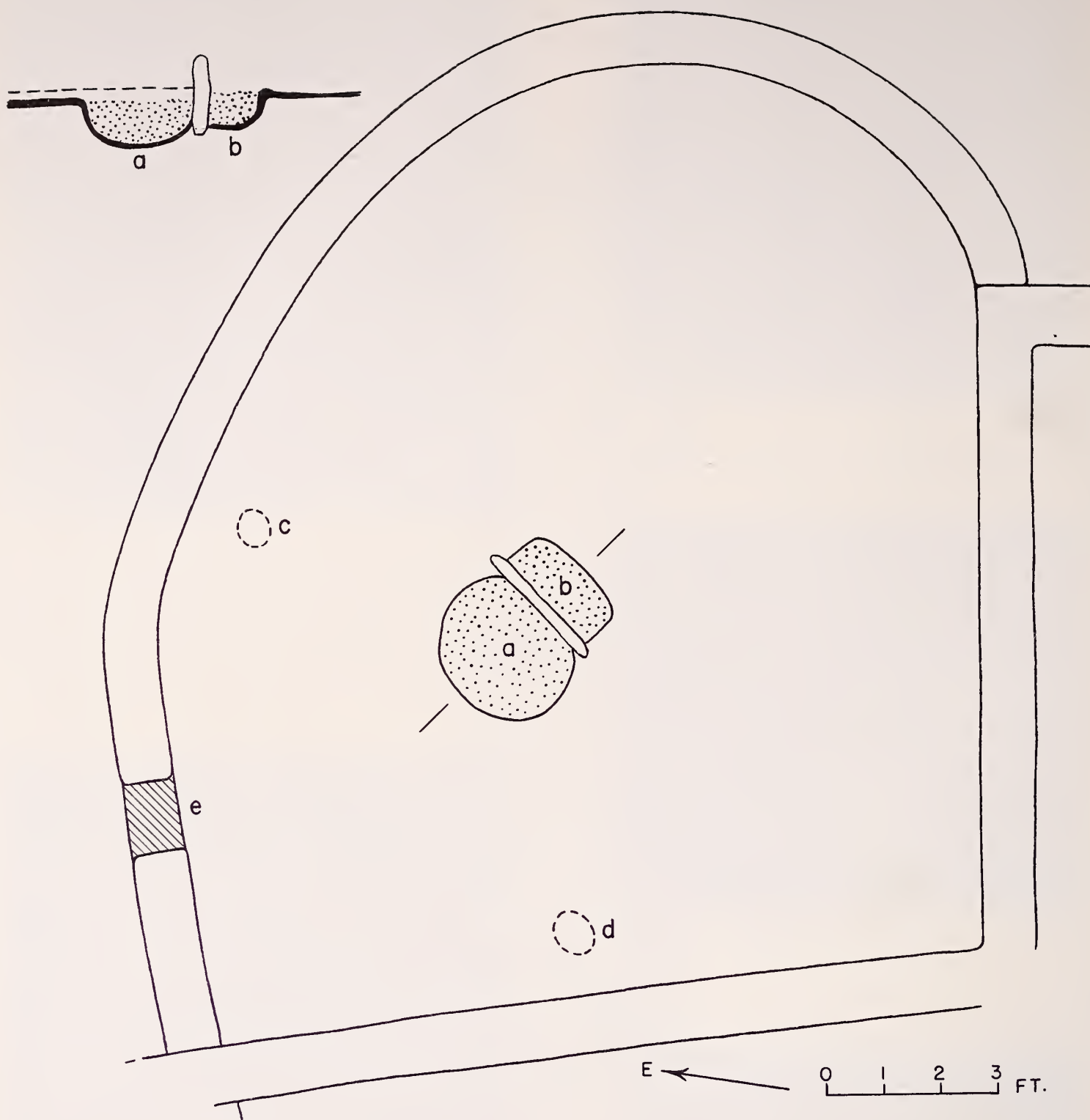


Fig. 14. Corner Kiva 4: a, early firepit? b, firepit; c, d, probable postholes; e, sealed ventilator.

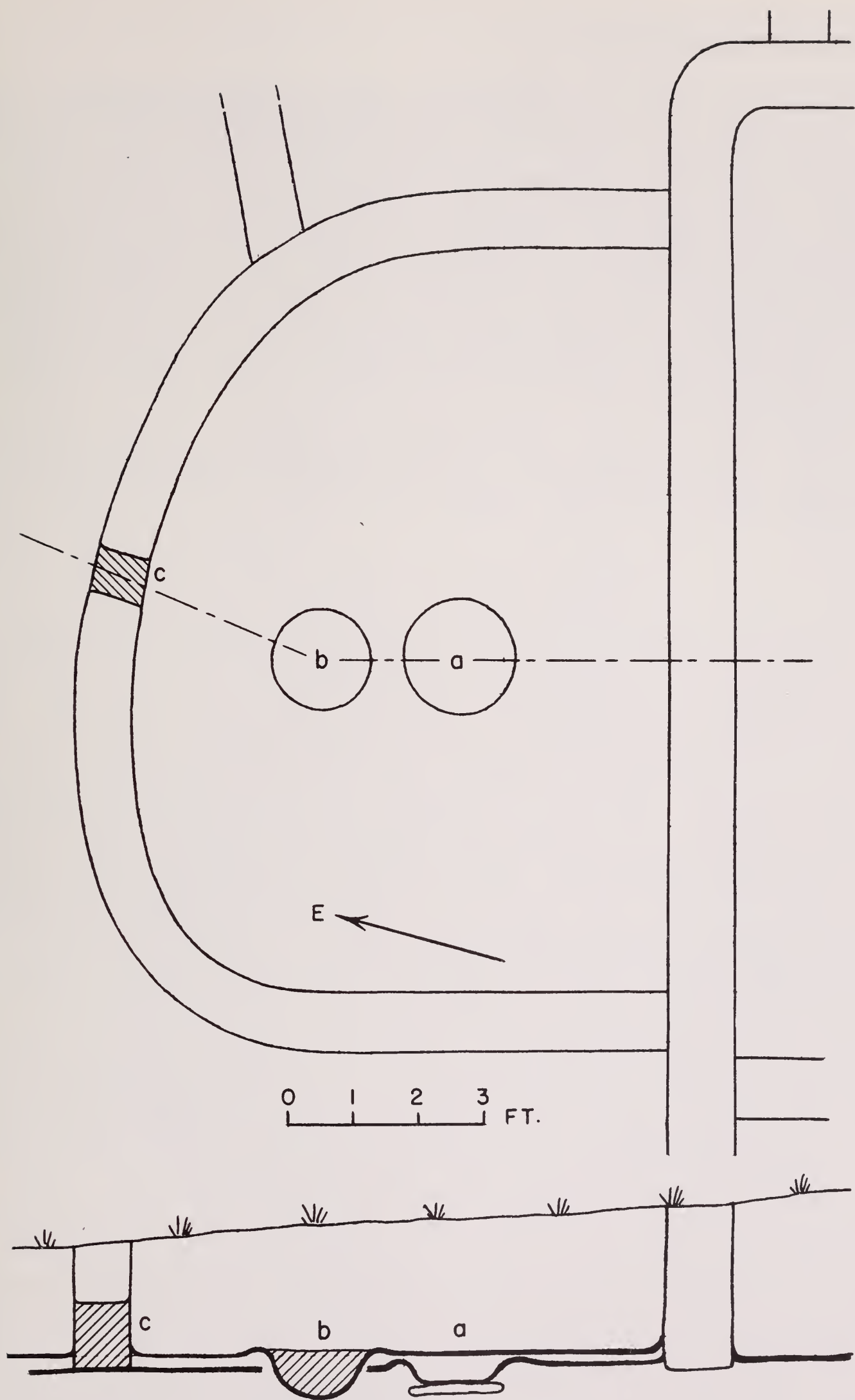


Fig. 15. Corner Kiva 5: a, unused firepit; b, firepit plugged with adobe; c, sealed ventilator (Fig. 13c).

series of stone-walled rooms was built over its southern end (Fig. 8a, b).

The walls, of coursed adobe, bore a sizing coat of the same material, but no lime plaster. To the east, at floor level, was an adobe-sealed ventilator (Fig. 15c), 8 inches wide, 10 inches high. There were two floors. In the lower, of gray adobe, was a pit (a) with a low adobe coping and sandstone slab floor. No fire had burned in it. In the second floor was another firepit (b), also with adobe coping. It was heavily burned, but the ashes had been removed and the pit filled level with gray adobe. As the second floor abuts the sealed ventilator and the first firepit (a) was never used, it is evident that this chamber, built as a kiva, was never used as such. For some reason it was at once converted into a living room.

Under the base of the wall south of the ventilator, scattered in a narrow area 10 inches long, were 25 small disc beads of shell and a single black stone bead of the same shape.

Age of Forked Lightning

Unfortunately, there are no reliable tree-ring dates from this site. Four, between 1113 and 1120, have been published, but being from charcoal fragments they are almost certainly too early (Smiley, Stubbs, and Bannister 1953:35). Stanley A. Stubbs, who throughout has given me the benefit of his unrivalled knowledge of New Mexican archaeology, estimates that Forked Lightning was occupied from about 1225 to 1300 (letter of June 17, 1954). The presence there of an incipient glaze-decorated redware, perhaps a proto-Pinedale Polychrome, indicates that the site was inhabited to about 1300. But the absence of Heshotauthla Polychrome, that appeared both at Rowe and in the Black-on-white deposits at Pecos, shows that it was deserted shortly thereafter. Occupancy much before 1225 is improbable because no Kwahe'e Black-on-white was found and Stubbs writes that the Chaco II Black-on-white representation in the Laboratory of Anthropology Survey Collection referred to in Smiley, Stubbs, and Bannister, page 35, was based on a single sherd that may have been wrongly identified. (These two early Black-on-white wares and other pottery types here mentioned are described and discussed in Mera 1934, 1935; Stubbs and Stallings 1953; Wendorf 1954; also, but in some cases differently named, by Amsden and Shepard.)

Stubbs, in the letter above referred to, says he feels that Forked Lightning was founded at about the same time as Pindi, but that it was abandoned some fifty years earlier than Pindi was. In terms of the nomenclature suggested by Wendorf (1954), its life would thus have been during the earlier part of what he aptly calls the Coalition Period, most of it in its first, or Pindi, substage.

No evidence has come to light, either at Forked Lightning or elsewhere in the upper Pecos Valley, of Pueblo occupancy during the preceding Developmental Period. This is strange in view of the fact that

sites of the later part of that Period have been reported well to the east and also farther down the Pecos (Mera 1935: Map 1). This and other problems of the Developmental and Coalition periods have been discussed by Miss Shepard and by me in our "Pottery of Pecos," and most recently by Wendorf and by Stubbs and Stallings in the publications above cited. It is encouraging that of recent years there has been an effective revival of interest in the archaeology of this part of the Southwest. It was never, of course, the seat of cultures as spectacular as those of areas to the west, southwest, and northwest, but knowledge of what happened in a peripheral region such as this would be of value in throwing light on important problems of diffusion and acculturation, for throughout their history its people were subject to influences from various parts of the Greater Southwest as well as from the Plains.

Since the above discussion of the age of Forked Lightning was written, Stubbs has spent some time there with T. L. Smiley of the University of Arizona's Laboratory of Tree-ring Research in an unsuccessful attempt to recover datable charcoal from the rooms I had years before found to have been burned. However, Stubbs collected from the surface several Chaco II Black-on-white sherds and so believes that the dates close to 1115 probably do represent an earlier occupancy of some part of the site. He thinks that the charcoal which yielded those dates may even have been from reused beams and does not feel that they necessarily represent the main occupation of Forked Lightning (letter of July 1, 1956). The finding of these sherds, which point to an earlier occupancy of Forked Lightning than I had formerly suspected, answers a query made long ago (Kidder and Shepard 1936: 598), namely, why were Chaco II sherds absent from Forked Lightning when they occurred to the east, at Tecolote, near Las Vegas, and even as far out toward the Plains as Watrous (Mera 1935: Map 1).

There can be little doubt that Forked Lightning was abandoned because of enemy pressure, presumably by nomadic tribes working in from the East. Such pressure may already have led to the desertion of the pueblo at Tecolote, near Las Vegas, and other outlying towns in that direction, as it later did to that of Rowe and Dick's Ruin in the Pecos Valley. Eventually, about 1400, Loma Lothrop and the Arrowhead village at Glorieta ceased to be inhabited and the entire Pueblo population of the valley probably became concentrated at Pecos, which presumably had already been receiving refugees from towns out toward the Plains.

There was no evidence that Forked Lightning came to a violent end. The ruins were, it is true, far from completely excavated, but most parts of it were tested by pitting or trenching without finding extensive signs, well known from other Southwestern sites, of wanton destruction, fire, and slaughter. In one quarter, as already noted, there had been an intense conflagration, but it took place well before the town was finally abandoned. Recheck of my notes on the first season's work leads me to doubt that certain skeletons formerly reported as unburied were actually victims of a massacre (Kidder 1926b: 6).



d



c



b



a

Fig. 16. Forked Lightning and Dick's Ruin: a, surface of Forked Lightning covering part of East Pueblo. Only in the arroyo bank (Fig. 3) could any trace of the extensive ruin be seen before excavation. In middle distance at right is recently cut vertical bank of Arroyo del Pueblo; b, Dick's Ruin (LA:276, Fig. 1) on terrace on west side of Pecos River. Tecolote hills beyond; c, Dick's Ruin. Living rooms of coursed adobe with a few stone walls. Glorieta Mesa in background; d, corner kiva in Dick's Ruin, looking southeast (Fig. 17).

The retreat from Forked Lightning was probably due to hit-and-run harassment that made life in so perfectly unprotected a site increasingly wearing. Pueblo Indians have apparently always been singularly willing to shift their places of residence. Hence the astonishing number of ruins throughout their former range, most of which were evidently not long inhabited. But to move, even a short distance, involved the transportation of much household equipment, personal belongings, and ceremonial paraphernalia; and, in leaving, there was sacrificed the heavy investment in labor that had gone into the buildings given up. So the departure from Forked Lightning could hardly have been undertaken lightly.

One can imagine the long, heated arguments pro and con; proposals, perhaps for joining the then still-functioning communities at Rowe or Glorieta; discussion, when it was finally decided to settle on a new site, of where to go. As security from attack was surely of first importance, the Pecos mesilla, a flat-topped ridge with abrupt sides, must at once have suggested itself. On the opposite side of the arroyo, it was only a few hundred yards farther up stream. It had of course been known to the Forked Lightniners all their lives. On the ridge, some 300 yards south of the great Pecos Mission--my notes are not exact as to distance --I found a scant surface scattering of Forked Lightning type sherds, evidently early, as the corrugated ware was of the sharply indented variety. There was no sign of walls. The small temporary settlement there must have taken place well before the permanent occupancy of the mesilla.

I have often pictured to myself the going of a party of the principal men to look the mesilla over. Some of them had probably not set foot on it since as boys they had hunted rabbits and played among the great rocks at its northern end, for its bare top, largely naked sandstone, could never have been cultivated. It was far more exposed than was Forked Lightning to the fierce westerly and northwesterly winds of winter and early spring. It did not offer such protection from attack as did, for example, the cliffs of Acoma. There was, however, no site of that impregnable sort anywhere in the valley. Yet it commanded an unobstructed view in all directions; its bare slopes carried no vegetation to hide sneaking foes. The fine spring in the arroyo to the west was no farther away than it was from the home that they were planning to leave. To get water from it required a bit of a climb. But that would be women's work.

So, sooner or later, it was definitely decided to make the move. It was almost certainly a shift of the whole population, for even conservative souls, averse to change, would hardly have dared to linger in a nearly empty town. However, the process was far less difficult than if new quarters were being prepared at a greater distance. The old houses could be occupied until new ones were ready and these were so close that all belongings could easily be carried there. This undoubtedly accounts for the fact that practically nothing was found in the rooms at Forked Lightning.

DICK'S RUIN

Dick's Ruin is an L-shaped pueblo of the Black-on-white phase. It lies about a mile and three-quarters south-by-east of Pecos on a low terrace above the west bank of the Pecos River (Fig. 1, LA:276; Fig. 16b, c). Some 15 rooms and a typical corner kiva were excavated by Dr. H. D. Skinner of Otago University, Dunedin, New Zealand in 1926, while a guest of Phillips Academy at Pecos. Architecturally, it is closely similar to Forked Lightning, most of the walls being of coursed adobe, only an occasional one, or part of one, being of masonry.

The kiva (Figs. 16d; 17) had been built into a corner of the pueblo by constructing a short stone wall and a rubble wall than ran from a wing of masonry rooms that had been added to a group of coursed adobe chambers. The walls were badly wrecked, much more so than the adjacent parts of the pueblo, that of rubble, composed of cobblestones from the river bed and bits of broken sandstone, being almost completely down. Its exact course, however, could be made out from the extent of the kiva's very firm and well smoothed adobe floor. The ventilator (Fig. 17e) seems to have opened into a short passage, but whether this gave onto a plaza, as did the simple "hole in the wall" ventilators of Forked Lightning, or connected with a vertical flue like that of the Glaze I kiva at the Arrowhead Ruin (Fig. 18) could not be made out, as the sides of the passage could be followed only as far as shown on the plan.

The floor fittings were conventional: heavily burned firepit (a) coped on three sides with adobe, a sandstone slab forming the east side; unburned ash-repository (b); simple deflector of adobe (c); south of the firepit a slab of igneous rock (d) slightly cupped and polished by grinding. The walls of the corner of the pueblo, that had become the north and west walls of the kiva, were smoothly plastered with adobe, but bore no lime plaster.

No kiva was found at the Rowe Ruin or at Loma Lothrop, but neither was extensively excavated. Dr. Guthe, however, ran a trench through the middle of one of the three plazas of the Rowe site, transecting an area in which kivas were to be expected.

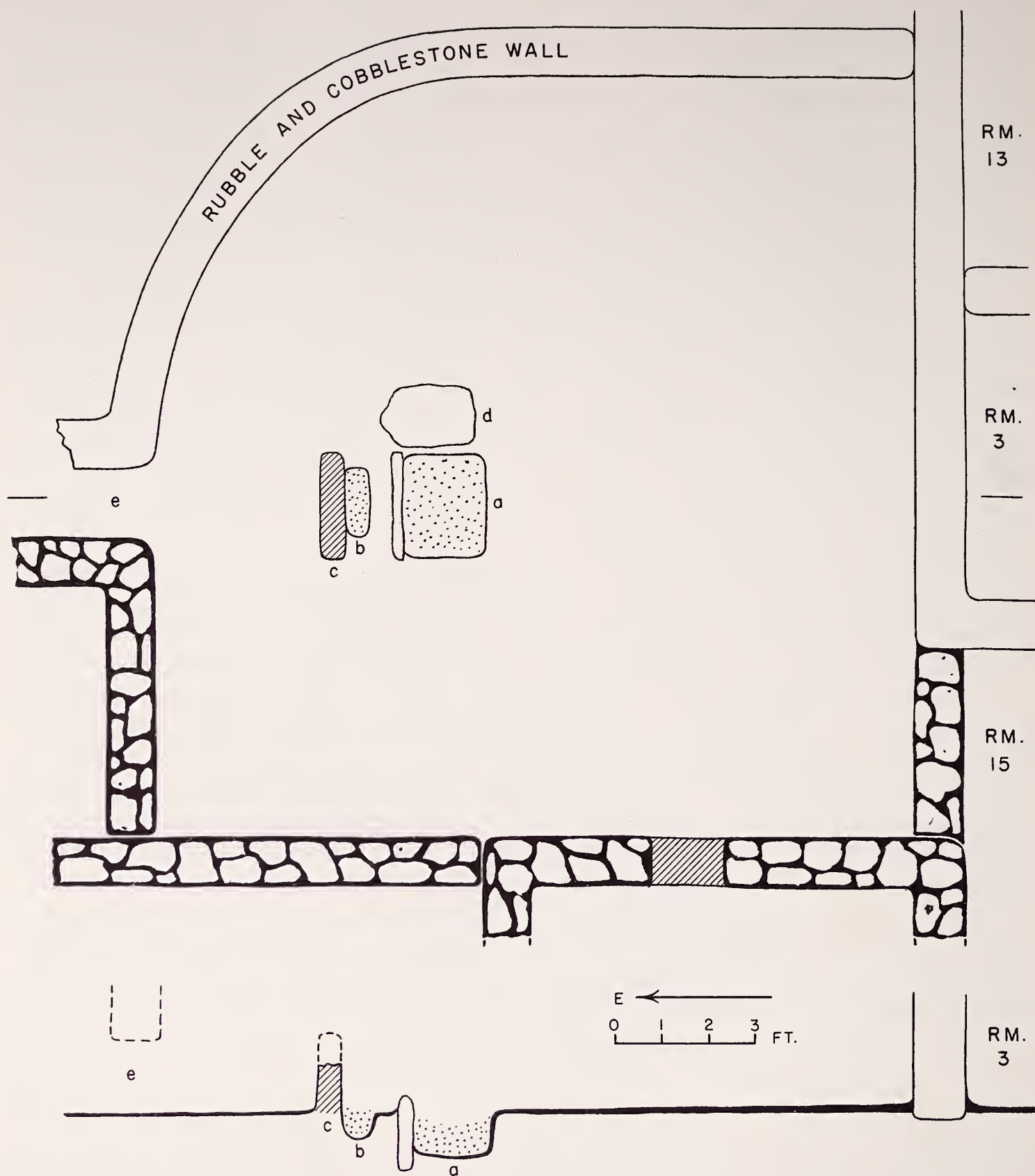


Fig. 17. Corner Kiva, Dick's Ruin: a, firepit; b, ash pit; c, deflector; d, grinding slab; e, ventilator (Fig. 16d).

ARROWHEAD RUIN

The Arrowhead Ruin (LA: 251, Fig. 1) was investigated during five field seasons between 1933 and 1941 by Dr. W. C. Holden of the Texas Technological College and by Dr. W. M. Pierce in 1948. Dr. Holden has very kindly sent me the accompanying plan (Fig. 18) of the kiva, excavated and restored by him, with the following description of this above-ground, masonry structure.

"This ceremonial room, the only one found in the ruin, presents some of the unusual characteristics found in the Pecos periphery. The surface layers had been disturbed prior to excavation, but the lower layers were untouched. The roof had burned and fallen in, but enough of the charred wood remained to indicate the general roof pattern. The structure was restored in 1933, and the general roof plan as indicated by the charred timbers was followed. The vigas were laid parallel in an east-west direction, the matting of pinon and juniper branches and leaves were placed over the vigas, and asphalt and gravel were used for capping the entire roof. This last was used because it requires less repair work than does adobe.

"The plan shows the peculiar 'D' shape of the kiva. The straight side of the 'D' forms the western side of the kiva, and is the eastern wall of Rooms 40, 28, and a portion of Room 38. The kiva does follow out the general form of similar structures throughout the Pecos region in that the ventilator or ceremonial entrance is at floor level on the east. The vertical flue of the ventilator is over 5 feet high. The fireplace is immediately west of the ventilator. The 'sipapu,' however, is located in the southern part of the room. It is 7 inches deep, and 10 inches in diameter. This ceremonial entrance from the underworld is usually found in a direct line with the ventilator, the deflector, and the fireplace.

"In the southwest corner of the room is an elevated fireplace. The base of this, set well back into the corner, is 2 feet above floor level. A flue opening directly through the roof at the corner, permits smoke to escape. The vertical opening of the fireplace in the room is 17 inches wide and 21 inches high. A bench, or banquette, extends into the room in front of the fireplace. This angles back on either side to merge with the walls.

"At floor level in the center of the south wall is a small opening extending back into the wall. This is 4 inches square, while another such aperture lies in the central part of the west wall. In the central part of the north wall is an opening running back into the wall, then turning upward at right angles to emerge through the top of the wall. This last might have been another small fireplace, while the other two openings were probably ventilators or caches. The floor of the chamber is of earth, while plaster is in evidence only in isolated spots immediately above the floor. The present roof is 7 feet above the floor.

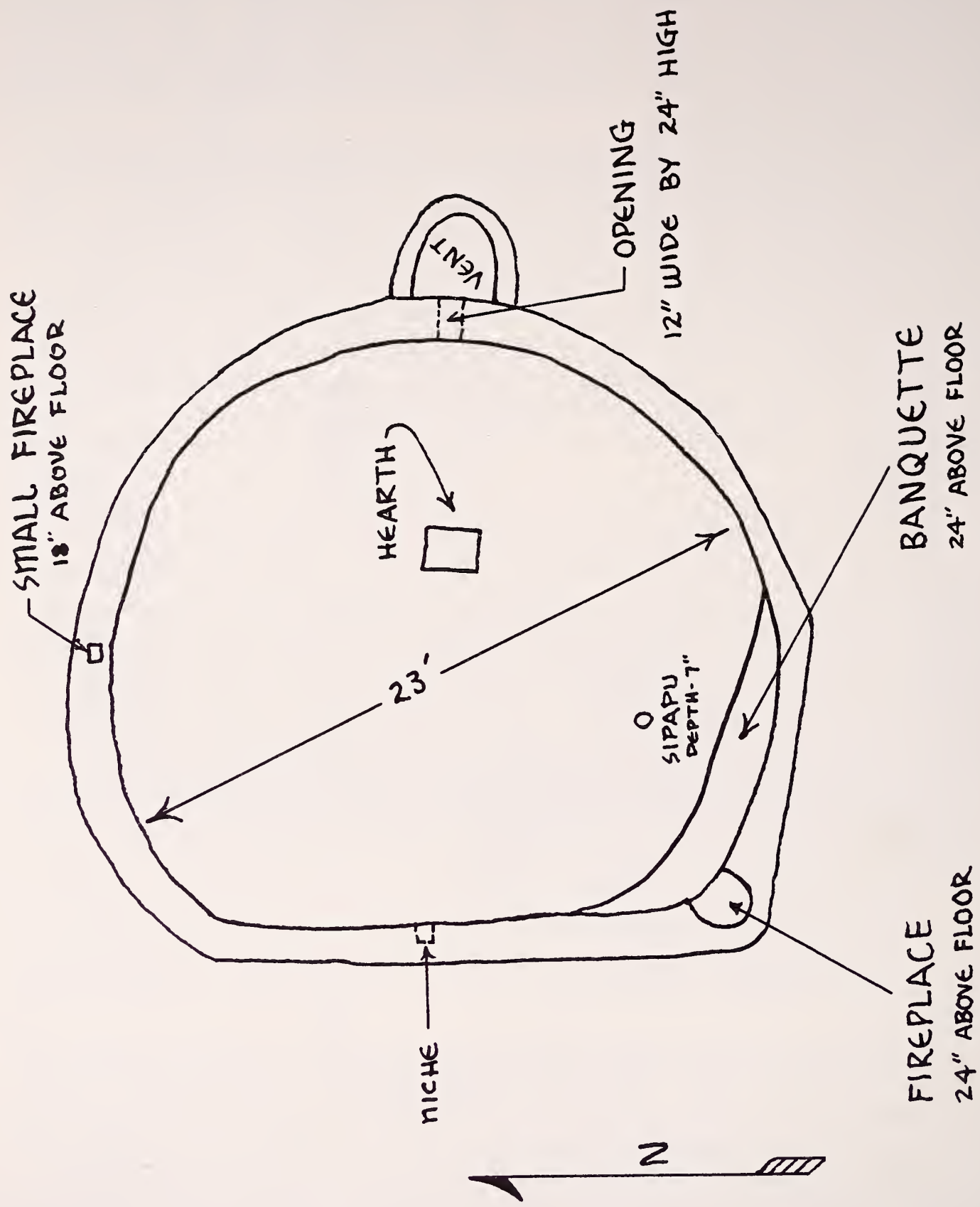


Fig. 18. Kiva at Arrowhead Ruin. Courtesy Dr. W. C. Holden.

"The whole plan is a baffling one. Several facts point to its construction after the pueblo was well established. First, two wood specimens show cutting dates of 1390 and 1392, while specimens from nearby rooms date 1370. Second, the west wall of the kiva is straight, which leads one to believe that it was serving as the eastern wall of Rooms 40, 28 and 38 before construction of the kiva was contemplated. Other rooms could have been destroyed to make a place for the kiva, or more probably, the site now occupied by the kiva was part of an open court. To save labor or to save space, the already-present wall was utilized in the building. Certainly the common circular plan was not faithfully followed. Perhaps the construction of the other three sides in a circular form eased the consciences of the builders. Their obligation to build in the accepted form was obviously not strong enough to prevent them from utilizing the straight wall. The position of the 'sipapu' and the presence of the raised fireplace must be designated, for the present, as local peculiarities."

In addition to the dates of the kiva given by Dr. Holden, others from the site are stated by Smiley, Stubbs, and Bannister (1953): 27, 28) to range from 1340 to 1393. When I was working in the upper Pecos Valley, I collected sherds of indented and blind corrugated culinary wares, Black-on-white, Biscuit A, and Glaze I, both Red and Yellow. The above authors, thanks to Stubbs' great knowledge of upper Rio Grande pottery, were able to break down and list the several varieties of Black-on-white, all of which occur at other late Black-on-white sites in the vicinity. It is notable that, as was the case with most of them, Arrowhead had no representation of the two early Black-on-white types, Chaco II and Kwahe'e, in my collection or that of the Laboratory.

The kiva was undoubtedly built during Glaze I, probably toward its end, as Glaze I Yellow came into use later than Red. It is the only certain example we as yet have of a Pecos Valley kiva of that phase.

Since the above was written, Jane Holden has published on Arrowhead (Holden, 1955) with plans of the pueblo and kiva. The former shows clearly that the kiva was set in the southwest corner of the small plaza. Its straight back (west) wall is built against the straight west wall of the plaza. Dr. Fred Wendorf, who visited Arrowhead in July, 1955 with Miss Holden and her father, is certain the west wall did not incorporate room walls of the pueblo and is therefore of later construction. The relation of the short, straight bit of south wall to the closely adjacent wall of the pueblo is uncertain, but this chamber should surely be called a corner kiva.

THE PUEBLO OF
PECOS

EARLY STRUCTURES

From the time of its founding, Pecos was a stone pueblo. Coursed adobe construction was given up, presumably because such an abundance of easily broken sandstone in the form of great slabs was available at the north end of the mesilla, particularly on the west side. There we found clear evidence of quarrying: great quantities of chips and not a few battered axes and hammerstones. Some of the latter, incidentally, were of a sort I've not seen elsewhere--halves of broken manos with notches for hafting pecked in their edges. A few hundred yards farther north, on a higher level of the rocky point that terminates in the mesilla, is an outcrop of finer sandstone horizontally so bedded as to yield easily detached, smooth-surfaced, flat slabs about an inch thick, of the sort much used at Pecos for firepit floors and edgings, door-sills, so-called "landing slabs" at the foot of kiva ladders, and many other purposes.

The first builders, like those who put up the few stone walls at Forked Lightning, were fairly conscientious masons. The earliest Pecos stonework is much the best. At that, it is not exceptionally good (Fig. 19a, c). Save for breaking to usable size and selection of pieces with the flattest edges for faces of walls, the stones were entirely unworked.

For perhaps seventy years, or until about 1370, Black-on-white remained almost the only painted pottery at Pecos. This was the first of a long series of decorated wares in use during the life of the pueblo. Many stratigraphic tests showed that the sequence of these wares was as follows: Black-on-white, Glaze I Red, Glaze I Yellow, Glaze II, Glaze III, Glaze IV, Glaze V, Glaze VI, and lastly, Modern Painted. There were also two so-called Biscuit wares: Biscuit A, found with Glazes I and II; and Biscuit B, found with Glazes III and IV. All are described and illustrated (Kidder and Amsden 1931; Kidder and Shepard 1936; Shepard 1942. See also the excellent papers on Rio Grande pottery by H. P. Mera 1932, 1933, 1935, 1940).

A sizable pueblo of the Black-on-white phase was built on the North Terrace (Kidder 1917). It and other early structures are shown in Fig. 20. The other general plan (Fig. 21) is limited to the principal pueblo of late prehistoric and historic times, Bandelier's Building A. In former papers, I have called this the North or Great Quadrangle; hereafter, I refer to it merely as the Quadrangle and its courtyard as the plaza. The long South Pueblo, Bandelier's Building B, is shown here only in Moorehead's restoration (Fig. 22). Plans of the few additional structures excavated south of the Quadrangle, together with the pertinent fieldnotes, are on file at the Museum of New Mexico.

Black-on-white dwellings other than those on the North Terrace were situated on ground afterward occupied by the Quadrangle. In the plaza, our trenches also disclosed a number of walls of Black-on-white age.

Fig. 19. Masonry, all Pecos save e: a, south wall Room 702; at left, part of wall of burned Black-on-white phase structure, abutted on right by Glaze I masonry of rebuilt pueblo, its stones characteristically less carefully selected for flat surfaces (see Fig. 8a, Forked Lightning); b, sealed doorway, east wall Room 1, north end of Quadrangle; this and c show typical late period masonry; c, west wall Room 1, Pecos mesa in background, Glorieta Pass at right; d, crushed down and bent late wall in Room E-III (Fig. 35); e, masonry of two Black-on-white phases in Rowe ruin; earlier at lower center and left; walls of one later room (upper left) not built directly on earlier walls; wall of other late room (upper right) founded on refuse accumulation against early structure; f, pavement of Room B-IV (Fig. 36).



a



b



c



d



e



f

On that part of the mesilla there was red clay to a depth, toward the west, of at least 10 feet, which even at the time of the first comers made it possible to sink kivas almost completely below the surface (Fig. 23). As will be seen further on, we found three round kivas that had certainly been dug during the Black-on-white phase (Nos. 5, 6, 10). But in the remains of the several Black-on-white pueblos, considerable parts of which were excavated in the plaza and elsewhere, there were encountered no square or corner kivas of Forked Lightning type.

During the centuries, household refuse, wind-blown sand, and much adobe washed by the torrential summer rains from the constantly renewed finishing coats of house walls, built up considerable deposits, both in the plaza and on the West Terrace. The greatest thickness of such material, however, accumulated down hill and down wind, off the eastern edge of the mesilla, where an enormous midden came to extend the entire length of the pueblo. Below the east entryway to the Quadrangle, it reached a thickness of over 20 feet (for photographs of trenches and stratigraphic tests therein see Kidder 1924). This vast rubbish heap gradually banked up against the low eastern cliff, destroying its original value as a protection from attack, but eventually resulting in the wide East Terrace that had sufficient depth for subsurface kivas. It was edged by the low stone defense wall that encircled the entire settlement.

South of the Quadrangle and to the north and west of the area where Kiva 13 (Fig. 20) was, probably much later, situated we excavated several rooms of what looked to have been a considerable Black-on-white pueblo. It was of special interest because it was one of the only two domiciliary structures on the mesilla that we could be sure had been burned. As in the part of Forked Lightning that suffered the same fate, much corn had been destroyed; but in this case the rooms had not been cleared; the debris was allowed to remain and not until late in Glaze I time was it leveled and floored over, the walls raised a little higher, and the quarters reroofed.

Pueblo construction involves so little readily inflammable material that it appears most unlikely that extensive conflagrations could be accidental. So I imagine that enemies, presumably from the east, had fired this part of the town. No other building of the Black-on-white phase buildings that we dug on the mesilla had been burned and, short of much more excavation, there is no way of telling how general this disaster had been.

We were never able to clean out enough of any one of the Black-on-white pueblos, except for that on the North Terrace, clearly to ascertain its size or shape. The Black-on-white North Terrace rooms as well as those south of the Quadrangle were succeeded in the late 1300's by Glaze I buildings. Some of these had overlain parts of the already ruined Black-on-white pueblo on the North Terrace and we found them to run south under the north end of the Quadrangle, but were unable to follow them farther (Kidder 1924; Fig. 2). No Glaze I walls were surely identified in the plaza, but an undetermined amount of Glaze I building had been done

on what was later the site of both the eastern and the western rooms of the Quadrangle. Extensive Glaze I structures, considerably added to in Glaze II times, covered practically the entire broad West Terrace (Fig. 20).

The Glaze I and II masonry (Fig. 19a), although not as good as the best Black-on-white work, was superior to that of later times. Many of both the Black-on-white and Glaze I-II buildings were evidently of no more than one story, as was indicated by the considerable number of their rooms equipped with ground-floor fireplaces. Their fairly sound masonry and the evident lack of high terracing should have made for stability. Nevertheless, very few walls were found to stand over 2 or 3 feet high. This was because stone and beams had been taken for use in other structures. During the early centuries the Pecos evidently kept moving about on the mesilla. When a group of dwellings began to get out of repair, the people seem to have considered that rather than fix up the old houses it was easier to shift to a new spot and build new ones, taking whatever materials they needed from those that were being abandoned.

In the course of these same centuries, too, it is probable that many, if not all, the people of the other towns in the Valley, which one after another were given up, came to live on the mesilla, necessitating additional housing. There may also have been increments from the east. So, for one reason or another, building must have been going on most of the time. From in and about the early rooms we recovered much stratigraphic information regarding the sequence of pottery types. We also got from many of them valuable lots of sherds of various phases, unmixed with earlier or later specimens because quickly deposited and then sealed in. Along the outside of their walls we obtained quantities of contemporary skeletal material and in some rooms that had been abandoned and filled with rubbish, many Glaze III and IV skeletons. Almost all of these were in better condition than those of the same phases in the eastern midden, because they had not been subjected to the pressure of so heavy an overburden. Architectural data, on the other hand, were very scanty, most walls being little more than stubs. And the rooms, which had naturally been emptied of everything serviceable when they were given up, yielded practically nothing in the way of household equipment.

The several preQuadrangle pueblos that successively housed the Pecos had been, so to speak, formless. It is true, as already stated, that we were not able to clear any one of them completely. Nevertheless, enough was done to show that one after another they had, like Topsy, "just growed." Rooms or groups of rooms had been added as need arose. In no case, it is evident, was one of these pueblos laid out and constructed according to a preconceived plan. Nor had Forked Lightning or Pindi. The town at Rowe with its three rectangular units (Guthe 1917) gives more the impression of having been planned than does any other early building in the Pecos country, but it was not sufficiently laid bare for Guthe to be sure how it had developed.

There is little more to be said regarding the Black-on-white and

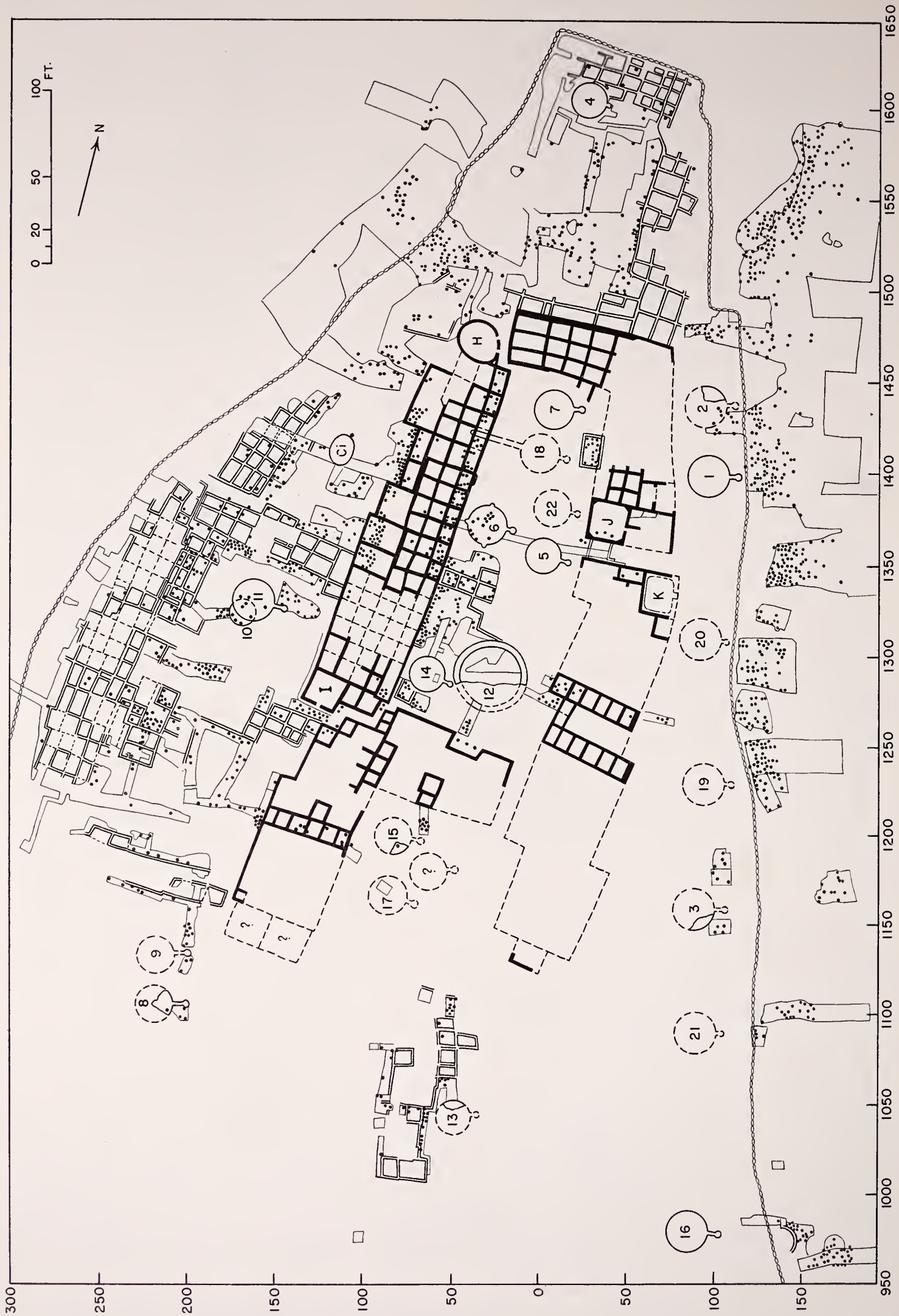


Fig. 20. Excavations at Pecos north of South Pueblo (see Fig. 22). Heavy lines indicate late Quadrangle (shown alone in Fig. 21); lighter lines, earlier ruins, all covered by later refuse. Trenches indicated by wavy lines, burials by dots.

Glaze I-II dwellings, because almost nothing was learned of them beyond incomplete ground plans. The pertinent field notes and photographs are in Santa Fe. Forked Lightning supplies fuller evidence as to the earlier Black-on-white structures of the Pecos Valley, Pindi Pueblo, near Santa Fe, as to those of the same and later Black-on-white times (Stubbs and Stallings 1953). One of the greatest needs of Upper Rio Grande archaeology is excavation of Glaze I sites, particularly ones whose occupancy was restricted to that phase, so that there would be no admixture of earlier or later material.

The above-described structures were not well suited for defense, in spite of their elevated situation on the mesilla. We have seen that there had been a destructive fire in Black-on-white times and evidence of a second came to light deep in the eastern midden. There, off the southern part of the Quadrangle's east side we encountered a large amount of heat-reddened, hard-baked chunks of adobe from walls and roofs. Associated potsherds seemed to place the conflagration late in Glaze II times or early in III. Contemporary rooms that had been ravaged by fire came to light under later construction in the little digging we did in that quarter of the ruin.

THE LATE PUEBLO

Whether or not it was brought about as result of such a catastrophe as the fire late in Glaze II or early in Glaze III just referred to, the former straggling one-story community was pulled together, so to speak, during the first years of Glaze III. A compact, four-sided, multistoried pueblo was built around a spacious courtyard (Figs. 21, 22). The time when this occurred is indicated by several kinds of evidence: the location of graves assignable to phase by mortuary pottery; the position of certain refuse beds showing chronological relationships; and the finding of Glaze I-II potsherds in the adobe mortar of some underlying walls from which all later ones were absent.

Quadrangle

The Quadrangle was the product of a new architectural concept which involved designing the building in advance and constructing it as a unit. I believe it to have been so well adapted to resist attack because of the possible arson of which we found traces, and fear of further depredations due to Pecos' by then exposed position on the extreme eastern Pueblo frontier. Its design may have been a local development or a specialized manifestation of a widespread architectural trend toward the strengthening of dwellings. We do not yet know enough about the prehistory of the Upper Rio Grande to be able to decide.

Characteristic of what, at least for Pecos, was a novel style was not only its defensibility but the rigid adherence to a transverse linear arrangement of rooms. This is seen not only in the nuclear Quadrangle, but also in the annexes that were added to its southeast and southwest corners, and in the long, straight South Pueblo. The lines of rooms divided the building into a number of units which were apparently always self-contained, for we never found a doorway between any given unit and its neighbor on either side. The units, whether three, or, more commonly, six ground-floor rooms wide, I call sections, using the word "tier" for the longitudinal lines of nonintercommunicating rooms. In Fig. 24, for example, Rooms 24, 28, 29 form a section; Rooms 56 to 52, a tier. The sections that were three ground-floor rooms wide were terraced upward from the court to a vertical back wall (Figs. 27, 33a); those of six ground-floor rooms were terraced on each side, the greatest height coming at the middle (Figs. 35, 36).

The sectional arrangement, as well as the defensibility of this type of structure, is clearly brought out by Castañeda's often quoted description of Pecos in 1540. This is worth repeating, because excavation has so fully confirmed it and also because to the architecture of no other pueblo does that chronicler devote so much attention. Pecos must accord-

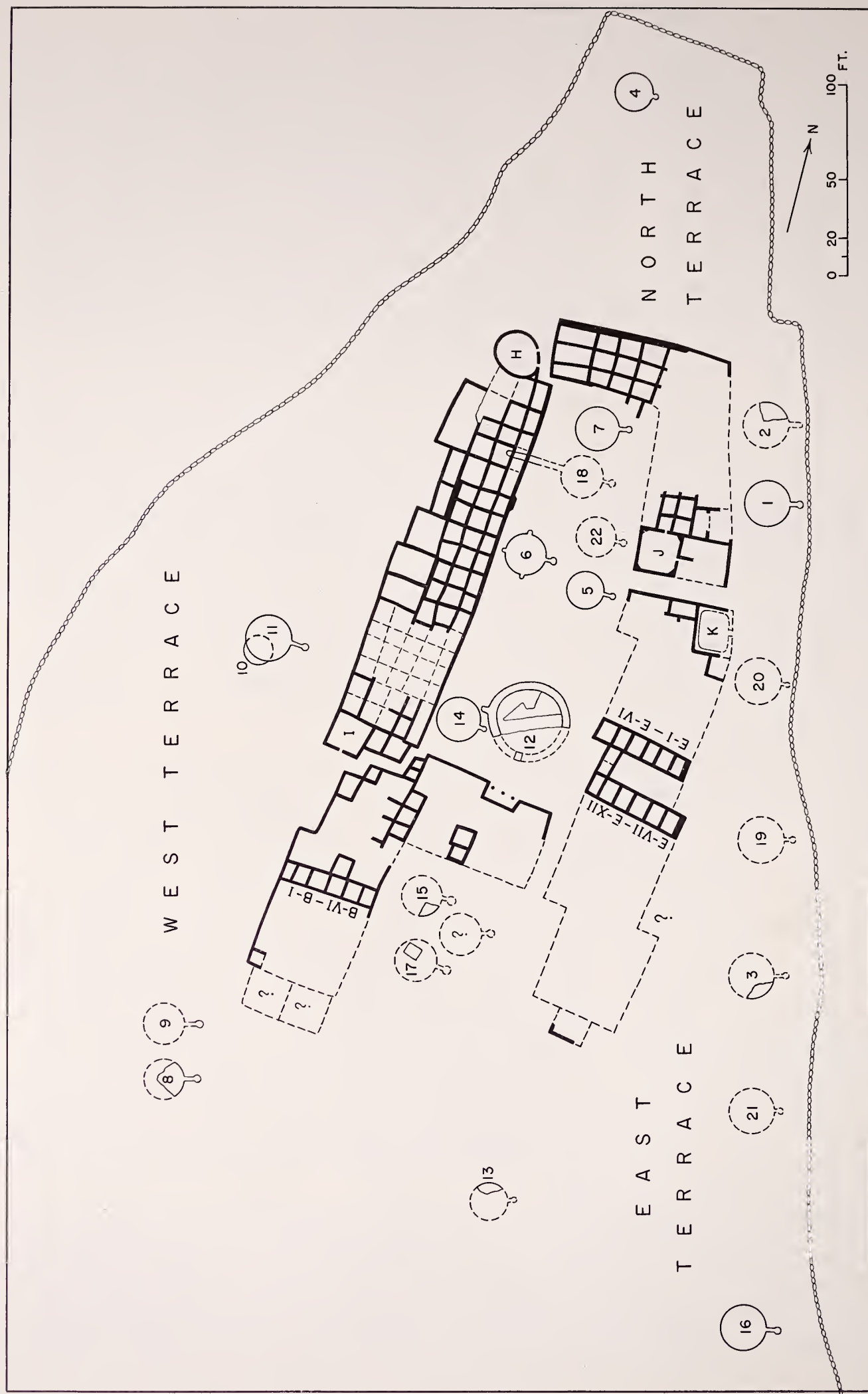


Fig. 21. Quadrangle, Glaze III phase and after; kivas of various phases.

ingly have stood strikingly out among the many that Castañeda saw. He says: "It is square, situated on a rock, with a large court or yard in the middle, containing the estufas (kivas). The houses are all alike, four stories high. One can go over the top of the whole village without there being a street to hinder. There are corridors going all around it at the first two [actually second and third] stories, by which one can go around the whole village. These are like outside balconies, and they are able to protect themselves under these. The houses do not have doors below, but they use ladders, which can be lifted up like a drawbridge, and so go up to the corridors which are on the inside of the village. As the doors of the houses open on the corridor of that story, the corridor serves as a street. The houses that open on the plain are right back of those that open on the court, and in time of war they go through those behind them. The village is enclosed by a low wall of stone" (Winship 1896).

De Sosa's account of taking the town in December, 1590, yields further data on its defensibility. I quote from Miss Hull's (1916) condensation of the rambling original. "Some [of the Indians] began to leave their posts, which the besiegers quickly occupied, mounting by means of ladders, and at frightful risk, because their arms had to be abandoned before they could pass through the trap-doors that gave access to the roof, swords and shields being passed up to them by the comrades who remained below. . . . The houses. . . . were built in the form of cuarteles (garrisons), the entrances all on the outside, and the houses standing back to back. They were all connected by wooden corridors or balconies which ran from house to house throughout the village. Intersecting streets [i.e. entrances to the plaza] were bridged by wooden beams. . . . Access to the houses was had by means of small ladders which could afterward be drawn through trap-doors in the roof."

It is clear enough that this strong structure had taken form during Glaze III and that the present plaza's establishment dates from the beginning of that phase, because in such digging as we did in it we found Glaze III sherds only superficially or in grave shafts or other late penetrations.

Wherever a sounding was made along the eastern edge of the plaza, the cultural deposit lay directly on sandstone bedrock, which sloped slightly downward to the west to an unknown but certainly not great depth (see section of Kiva 5, Fig. 43). On apparently the whole western three-quarters of the plaza, that is to say as far as the rocky edge of the flat-topped north-south ledge on which the Quadrangle's western rooms were built, the mesilla was overlaid with tough, fine, red clay. From the clay upward, the sequence was everywhere the same: Black-on-white, Glaze I Red, Glaze I Red and Yellow, Glaze II. The strata varied somewhat in thickness in different parts of the plaza, that comprising the Black-on-white to Glaze I Red usually being heavier than that with Glaze I Red and Yellow to Glaze II. Where no disturbance had taken place, the uppermost aboriginal stratum was a long-used living surface, nearly a foot of sterile, dark, closely compacted, greasy-looking, thinly-layered material.

Most of our excavation of late rooms was done in the Quadrangle,

largely on the west side. Considering the structure's size, we investigated few enough. Of many, only the uppermost deposits could be examined, because of the precarious condition of such parts of their walls as still stood. However, we determined the size and position in the pueblo when last lived in of all those rooms outlined in heavy black on the plan (Fig. 21).

I say last lived in because during the bad times, from about the middle of the eighteenth century on, the population shrank, at first gradually but progressively more rapidly, and more and more rooms became untenanted. This left gaps in what had once been solidly occupied structures, often depriving families or larger groups of immediate neighbors. Quite naturally, under such conditions, the people tended to bunch up and, as sections were deserted, to move together and so close empty spaces. This was accompanied in some places by a certain amount of revamping of rooms.

Permanently vacated quarters were allowed to fall into disrepair. Roofs, not being kept tight, allowed water to seep down and soften foundations that had never been too sound. Freezing in winter, it forced open disastrous cracks in the masonry. In the few cleared rooms which, at Dr. Hewett's request, we had not back-filled we could see these destructive processes at work after every heavy rain and when we returned in the spring. And from the state of the different parts of the ruin (we did at least test digging in each major quarter of the Quadrangle) we were able to follow the advance of its nearly century-long disintegration.

It was clear that the bunching up or huddling of which I have spoken continued to the very end, the long, slow decay eating its way northward in both the South Pueblo and the Quadrangle, the rooms at the north end of the former and those of the northern and northwestern parts of the Quadrangle being better preserved, or rather less hopelessly ruined, than the ones farther south in each building. Bandelier also noted this. In his day, indeed, walls in those quarters stood a good deal higher and more roofs remained than when we came to Pecos thirty-four years later.

I have hurdled the centuries that intervened between the construction of the Quadrangle and the last sad years in order to make clear the conditions we encountered there. We now return to its original building which, as I have said, took place in Glaze III. As at first laid out, it was, I think, a simple rectangle. The extension running south from the south end of its west side proved, when we cut through it (BI-BVI Figs. 21, 36), to have been built later than the main structure as we found Glaze IV sherds under the floors of its rooms. I presume, although without the evidence that excavation might supply, that the shorter south extension from the east side was also an addition.

Aside from our limited amount of trenching and kiva digging in the plaza, most of the work on the Quadrangle was done in its western rooms (Fig. 24). Its lamentable state became apparent in 1916, the second season at Pecos. The summer before had been spent in trenching and making stratigraphic tests in the great eastern midden; the winter of

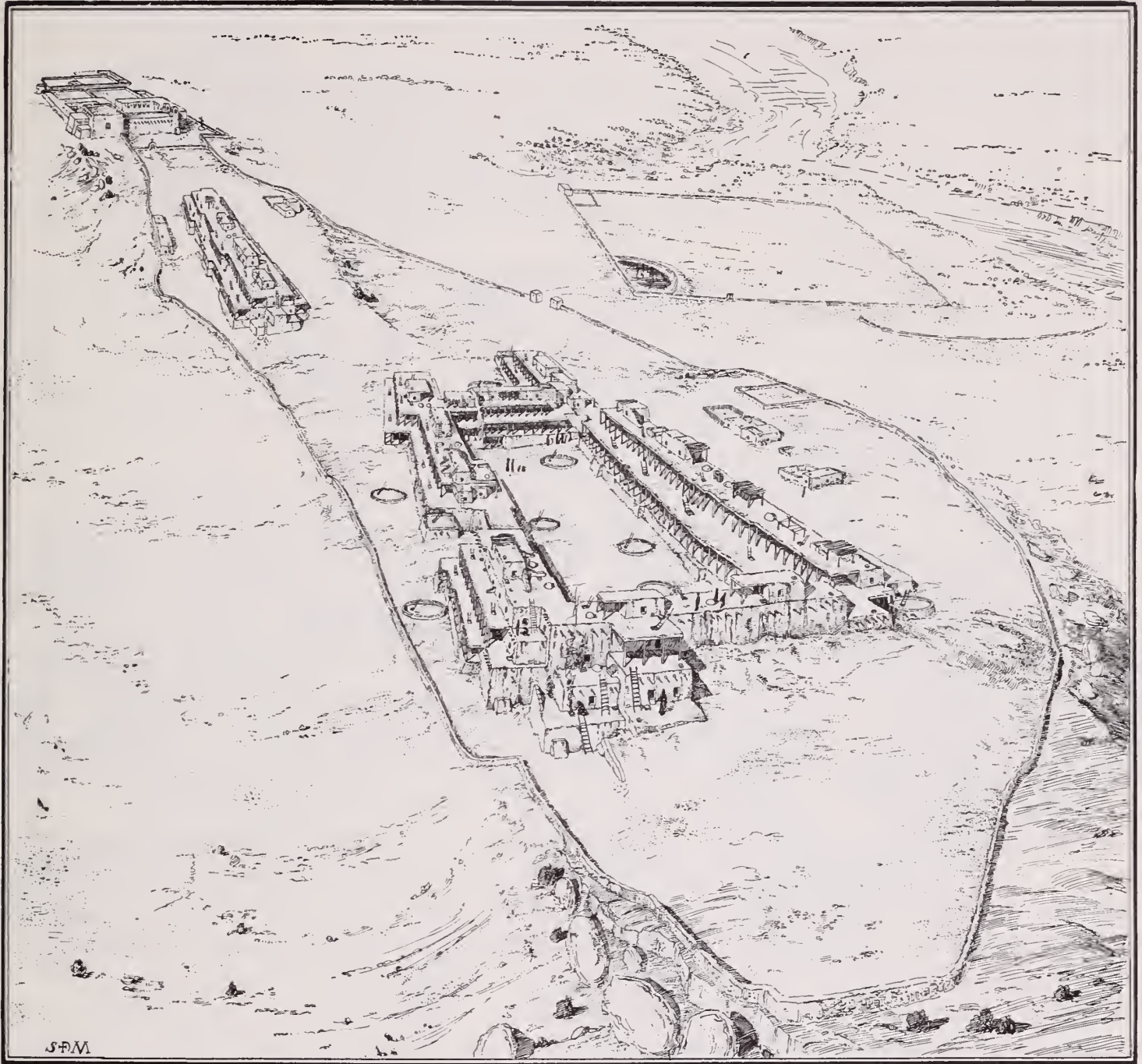


Fig. 22. Pecos from north: Quadrangle, South Pueblo, Mission and Convent beyond. Restoration by Singleton Peabody Moorehead as of about 1700.

'15-'16 in studying the resultant enormous quantities of sherds. We had found the midden so unexpectedly deep and so full of time-consuming burials that we had tapped only the deposit directly below the Quadrangle. Much trenching--vastly more, as it turned out, than I then supposed--remained to be done, but I felt that enough of a start had been made toward becoming acquainted with the pottery types represented and in learning the order of their succession to provide me with the ceramic evidence I felt sure would be needed in excavating the pueblo.

It certainly was needed. Without it my colleagues and I would have been hard put to it to make any sense out of the horrible smash we had to deal with in the ruins.

I have already spoken of what summer rain and winter frost had done to the pueblo during its progressive depopulation. Added to that was the post-abandonment wreckage, written of by the Englishman, Kendall, as early as 1844, that was caused by travellers on the Santa Fe trail pulling out beams and planks for firewood. People of the growing Mexican town of Pecos, not far to the north, also did their share.

Native neglect followed by American and Mexican vandalism took such disastrous effect because of the wretched masonry of the later centuries (Fig. 19**b**, **c**, **d**). Bandelier, all too leniently, calls it "judicious piling." But an even more fundamental weakness was caused by the frequent building, particularly on the east and south sides, of walls on the broken and tumbled walls of earlier rooms, which themselves had been erected on still earlier ones. Much of the original construction had been insecurely founded on uneven, rocky, sometimes sloping, surfaces. Successive ground plans had seldom exactly coincided, and this caused differential settling.

Realization of these lamentable facts came with my first attempt to get to bottom in one of the north rooms of the Quadrangle. It was a shock, because such digging as I had done before had been in the solidly constructed cliff-dwellings and surface pueblos of the Mesa Verde and the Kayenta country. I had also worked at Puyé and Tuyonyi on the Pajarito Plateau. The two latter pueblos were fairly closely contemporaneous with the Pecos Quadrangle, but each had been the first occupant of a smooth, level site. Furthermore, like all late Pajaritan ruins, their walls were of tufa, soft enough to be worked into long, brick-like pieces that lent themselves to orderly coursing (Morley 1910).

The stub-walled early ruins on the North and West Terraces could be cleared, studied, and back-filled without suffering harm, but to remove the fill of a room in the Quadrangle, even if only to its latest floor, almost always brought about the collapse of some of its walls, and to go deeper without tearing away the upper masonry exposed workers and staff to very real danger. A second reason for avoiding the Quadrangle was that when work was resumed after World War I, the optimistic 1920's were upon us and there seemed no doubt that funds could be had, in fact one large donation had tentatively been offered, for an extensive program of development as a State Monument of this historically important and,

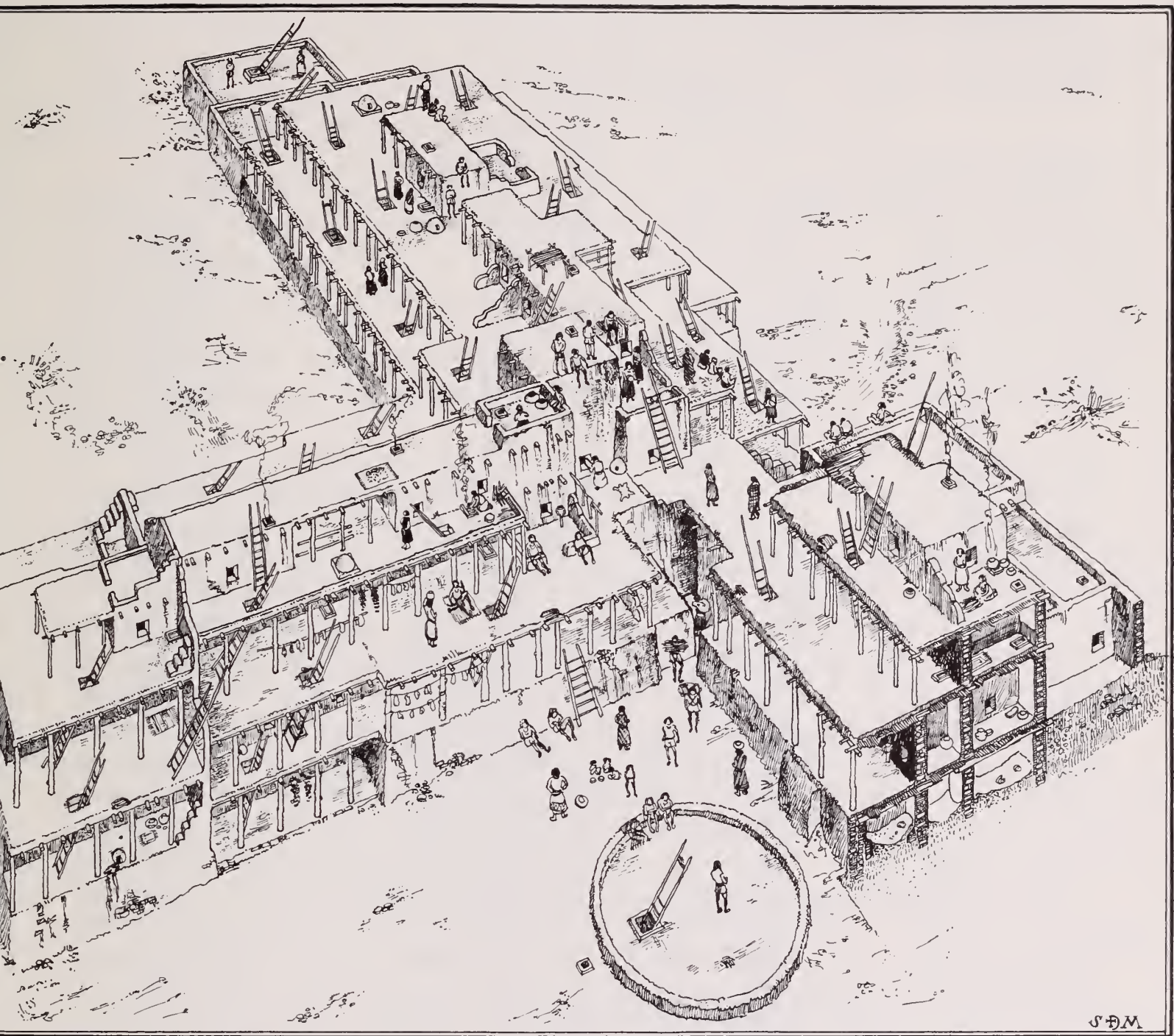


Fig. 23. Southwest corner of plaza. Kiva 14 in foreground; southwest entryway at junction of west and south sides of Quadrangle; west side transected to show second- and third-story galleries (Sp. coredores) and interiors of rooms. Restoration by S. P. Moorehead.

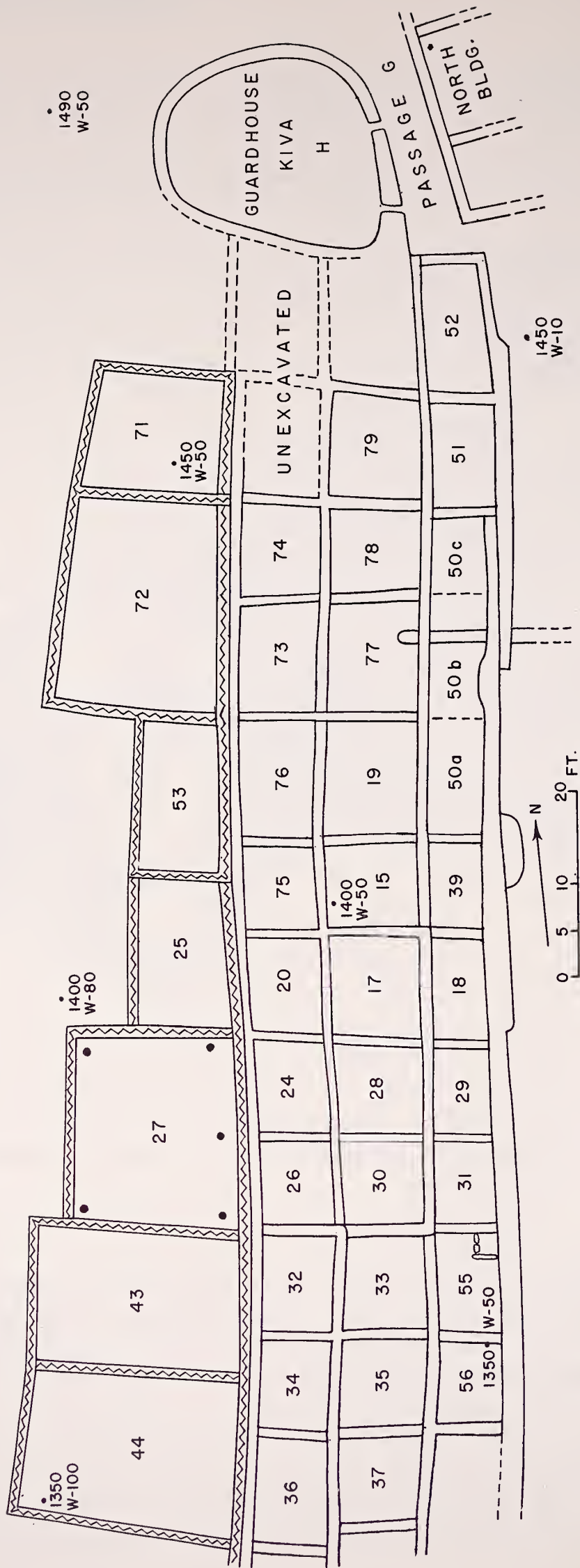


Fig. 24. Northern rooms, west side of Plaza. Walls of large, very late rooms marked with zigzag; remains of early rooms beneath latter not shown, but see Figs. 25, 26 for those below Rooms 43, 44.

because of its situation on a main transcontinental highway, most accessible of all major Pueblo Indian ruins. But, as without immediate stabilization any considerable amount of excavation in the Quadrangle would have resulted in irremediable harm, I did only as much as I deemed necessary for a preview, so to speak, of its architecture. Before any repair could be undertaken, however, there came the financial crash of 1929; also the call to work on the ancient Maya, a people, I may say, who have never supplanted the Pecos in my affection.

As shown by the plan (Fig. 21), more of the Quadrangle's western rooms were examined than those of the other sides. We concentrated on them because they were evidently among the last to be abandoned and some of them, although in a horrible state of ruin had, we found, fairly solid early construction below them. Certain of the preQuadrangle walls, indeed, that had been firmly founded on bedrock had merely been braced and then added to sufficiently to bring them to the greater height called for by the three- and probably in places four-story architecture of late times.

So we were able to dig to bottom, study, and refill not a few of the western rooms with relatively little damage to them or danger to our workmen and ourselves from collapsing walls. A considerable number, however, had upper walls in such precarious condition that we dared not clear them below the floor of the first story. These rooms are described below. We also dug, but most of them only to their latest floors, a few rooms on the north and south ends of the Quadrangle and others on its east side immediately south of the east entryway. The original width of the north side we could not determine without tearing away several late additions. I believe that, like the west, it originally had three-room sections. The whole east side, with the possible exception of its extreme northern part, and including its presumably added south extension, had had the conventional six ground-floor room width. The rooms north of the east entryway had seemingly been founded on earlier structures, which appeared to have been built on still earlier ones with east-slanting bedrock below them. Whatever the reason, the entire mass had either slipped down to the east, or its eastern part had disastrously sagged. In either case the wreckage was appalling. This had come about well before the abandonment of most parts of the pueblo, for that area had served as a dump for very late refuse. Some of our best lots of Modern Painted, a ware thought to have come into use after 1700, were from the ruined late rooms--we dared dig no deeper.

South of the east entryway, on either side of which was a so-called guardhouse kiva (J and K, Figs. 21, 64) things were somewhat better. There we cleared two sections, going to bedrock in each and finding that what we called the E-Series rooms of the late or Glaze III pueblo had been erected on remains of Black-on-white, Glaze I-II, and perhaps very early Glaze III dwellings (Fig. 35). These are described below.

As to the south side of the Quadrangle, we learned very little. It seemed to have been six rooms wide. It was in such horribly bad shape

Fig. 25. Plan, not to exact scale, of part of west side of Quadrangle to show clustering of burials along exterior walls of occupied houses. Numbers are of burials, those underlined contained mortuary vessels that permitted positive assignment to ceramic phases (Table III). Symbols showing phase of certain walls: zigzag, high level walls of large, late Glaze V rooms, 44y, z, 43w, x, 27; xxx, Glaze I walls founded on stone-robbled Black-on-white walls. Most of the xxx wall was kept in use as the west walls of the later abandoned Glaze III rooms, 44y, 43w, 27; small triangles, east-west walls of rooms facing plaza, probably built in late Glaze III or early Glaze IV; small circles, Black-on-white walls not overlaid by later construction, as had been those under xxx walls; unmarked walls (except easternmost, which should have borne triangles), not certainly dated, probably Glaze III, some founded on earlier walls. Dashed line indicating line of section (Fig. 26) jogged to pass through significant burials. Below are shown methods of indicating wall relations in this and other plans; 1, wall abuts; 2, passes beneath another wall; 3, wall built continuously around a corner, others abut; 4, data lacking.

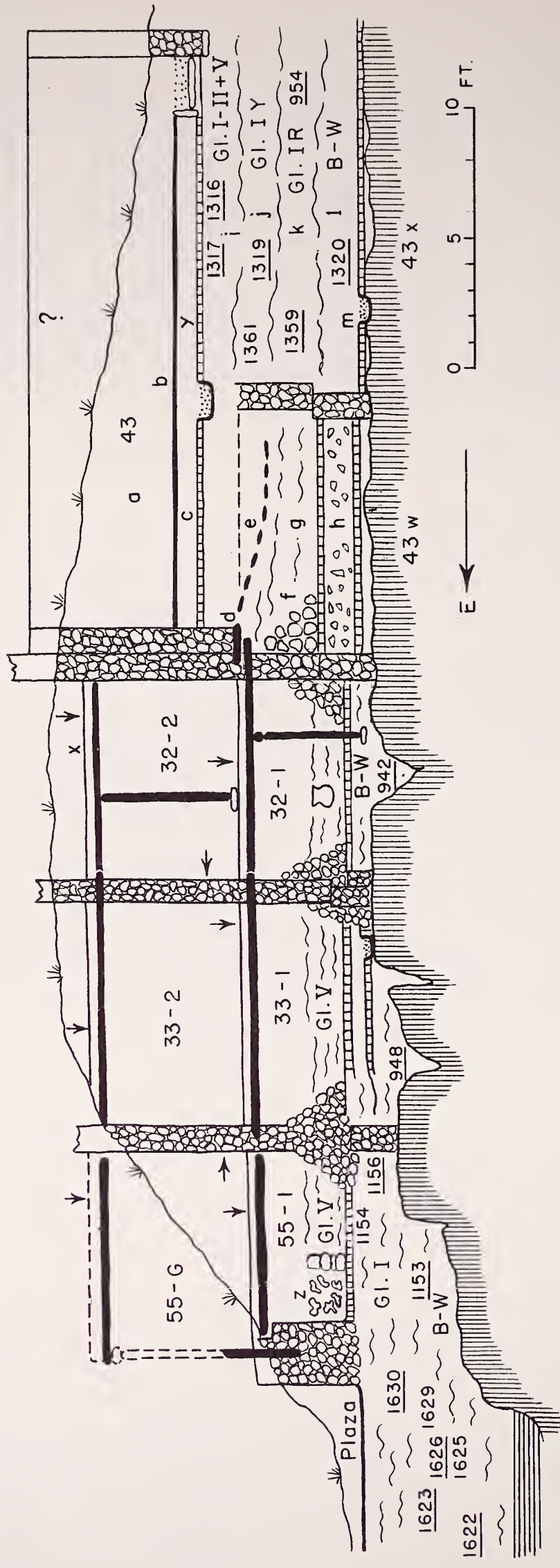


Fig. 26. Section through west side of Quadrangle and into plaza on jogged line in Fig. 25: a, area of fallen wall stones in Room 43, underlain by refuse with Glaze VI and Modern sherds; b, tramped living surface, with Glaze V refuse below, large rectangular, slab-floored and walled firepit against west wall; c, well laid, finished, brown adobe floor with oval adobe-lined firepit; d, butt, embedded in wall, of decayed roof-beam of low-studded basement room, built in Glaze I, later incorporated into Glaze III pueblo; e, remains of the basement roof; dashed line indicates original level; f, roughly piled rock "buttress" against west wall, a typical feature of late basements; g, typical basement deposit of rotted organic matter and many bones of native animals;

h, remains of Black-on-white phase room, walls stone-robbed to mere stubs, fill of clean sandstone fragments and chips (masons' debris?) to level area for adobe floor; i-l, refuse heap considerably mixed by grave shafts, but stratification remained in general as shown; m, oval firepit in Black-on-white room floor of adobe spread over earth in shallow depressions in bedrock. Beams, posts, slats, in black (roof beams all found but all crushed down; here shown in undoubted former positions). Gallery support and roof, broken line. Restored walls and floors, plain line. Floors found in place, vertical hachure. Probable approximate positions of doors and hatchways, indicated by arrows. The great masses of fallen wall stones that crushed roofs and filled all rooms not shown.

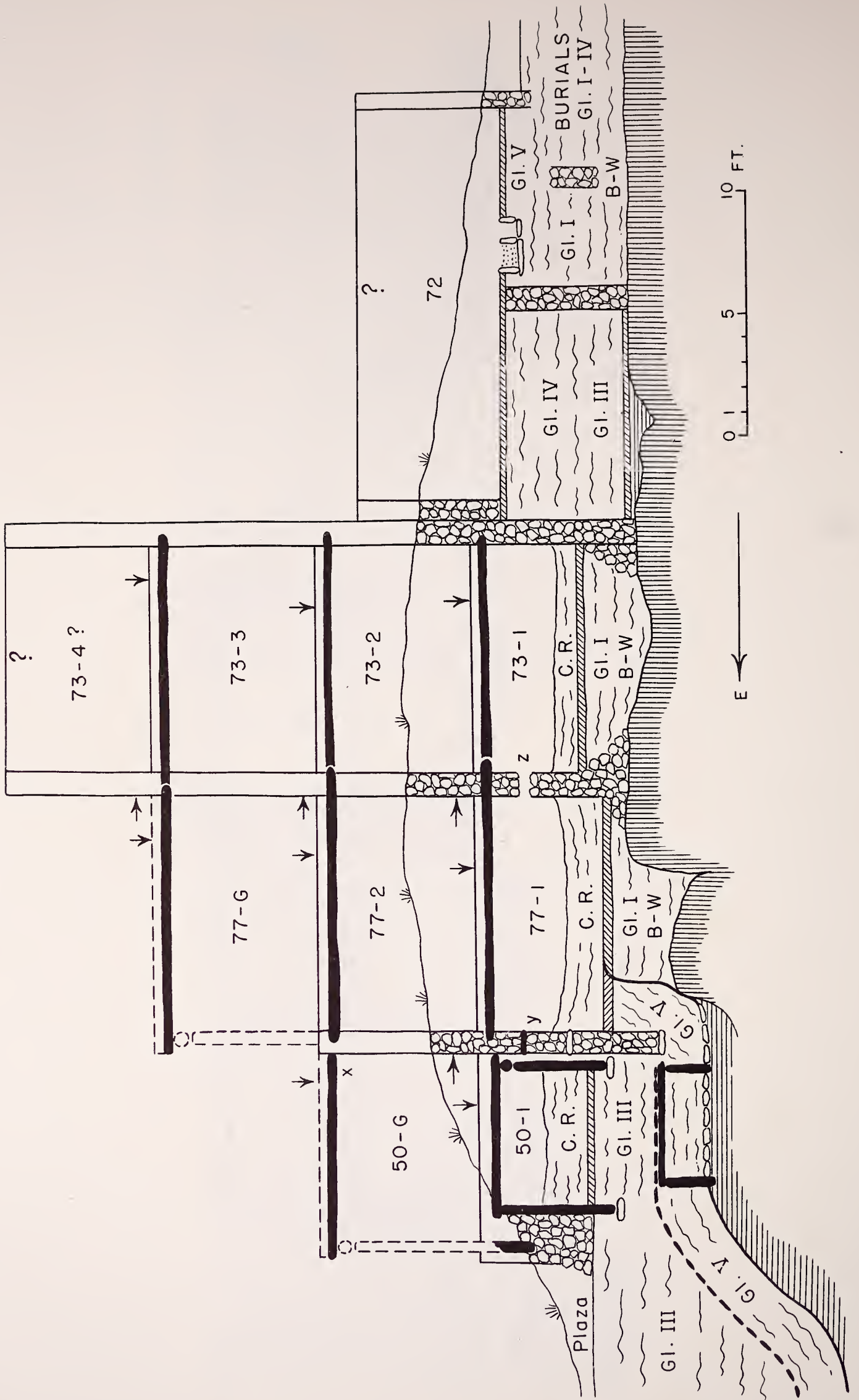


Fig. 27. Section through Rooms 72, 73, 77, 50, west side of Quadrangle, showing subterranean passage, later blocked and filled, that led from Room 77 into postulated Kiva 18 (Fig. 21). Nature of support of beam at x unknown: y, blocked doorway with wooden lintel between Rooms 50 and 77. z, small opening between Rooms 73 and 77. Symbols and arrows as in Fig. 26, except that in situ clay floors are, by mistake, in oblique hachure. C.R. denotes cellar refuse.

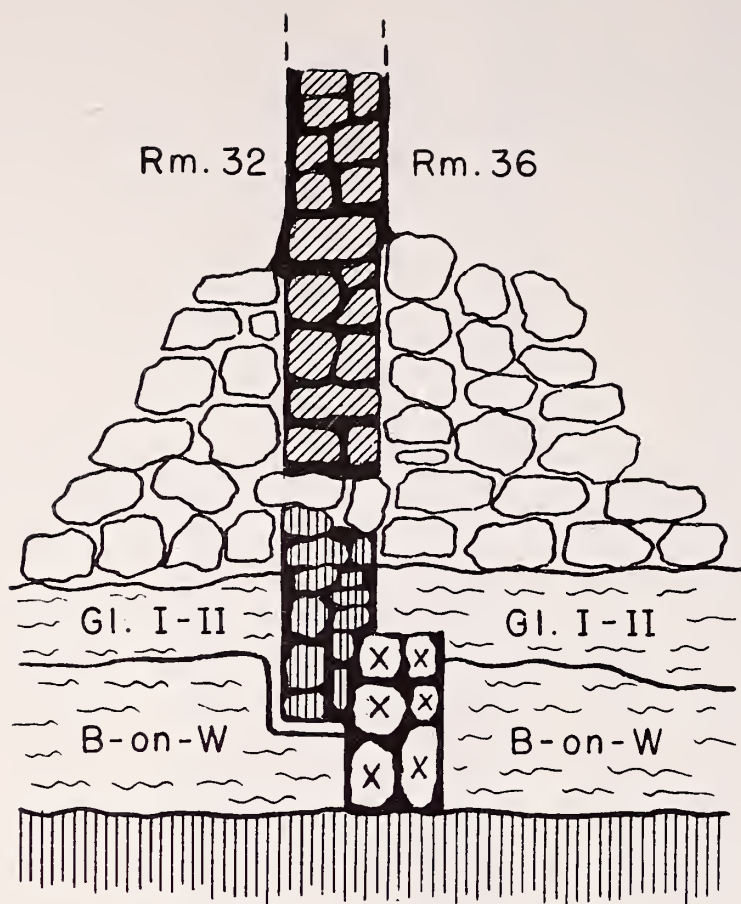


Fig. 28. Diagrammatic section, looking west, of base of wall between Rooms 32 and 26 (latter misnumbered 36; correctly in Fig. 24). Shows footing of Glaze III wall (oblique hachure) on stubs of Glaze I-II (vertical hachure) and Black-on-white (x, x) walls. Latter built on bare bedrock. After considerable debris had accumulated against it, the Black-on-white wall was mostly destroyed and in Glaze I a new one was erected, partly in a foundation trench, partly on the butt of the old wall. When, in Glaze III, the quadrangle was built, the wall between the two rooms was founded close above, but not directly on, the Glaze I-II stump. Its masonry was laid, as in the earlier walls, in adobe mortar. Finally, it was "buttressed" by heaps of dry-piled stones.

that in none of the few chambers tackled was I able to get to bottom. The extension of the west side, south of the southwest entryway was an addition. Since it was in fairly good condition, it was possible to clear one of its sections to bedrock (B-Series rooms, Fig. 36).

During its entire occupancy the west side of the Quadrangle was but three ground-floor rooms wide, but early in Glaze IV the westernmost tier (Rooms 44y, 43w, east part of 27, Fig. 25) was given up, and a new tier was added on the east. The early western tier had been constructed in Glaze III by building on wall stubs of eastern rooms of a Glaze I-II pueblo that had occupied a large part of the West Terrace. Of the enclosures west of the western tier rooms listed above, we indicate (Figs. 25, 26) the walls and burials beneath 44z, 43x, and west part of 27. We also found remains of them under the other large late rooms (27 to 71, Fig. 24). These we partly or wholly excavated, and show in Figure 20.

The early western rooms, although founded on still older Black-on-white and Glaze I walls had good, level bedrock below them (see west wall of room under collapsed roof e, Fig. 26, and Glaze III room under Room 72, Fig. 27). Nevertheless, as has been said, they went out of use. The three-room ground-floor width of that part of the pueblo was, however, maintained by adding, in Glaze IV, the above-mentioned new plaza-fronting tier (Rooms 56 to 52, Fig. 24). Why this was done I cannot understand, for this late tier was erected on old and grave-riddled Black-on-white and Glaze I rubbish overlying down-dipping and irregular bedrock (see Rooms 55, Fig. 26; 50, Fig. 27). I can only surmise that this very unwise move, which ultimately led to settling of foundations and canting eastward of most north-south walls, was made when the builders had lost all memory of the fact that firm bedrock was no longer close below.

I have spoken of the ground beneath the new eastern tier (Rooms 56 to 52, Fig. 24) as being full of graves. And so it was, for under the floors of its eleven rooms were 61 burials, of which 38 were accompanied by mortuary pottery, a far higher percentage, incidentally, than obtained in most other parts of the ruin. The period distribution is shown in Table II on page 82.

During preMission phases at Pecos it was customary to bury at least some of the dead just outside the walls of rooms that were then inhabited. Therefore, the many Glaze I skeletons found under the 56-52 tier suggest that Glaze I people had been living in rooms where the 37-79 tier later came into being. I found very little other evidence of this, because the bases of all walls in these tiers were, for support, so piled about with heaps of stones that one could almost never safely examine them to determine just when they had been built (see Figs. 26, 27). In one case, however, the whole upper part of the north wall of Room 32 fell, fortunately during the night, and we could pull its base to pieces, bringing to light the stubs of Black-on-white and Glaze I walls (Fig. 28). This had no direct bearing on the age of the earliest plaza-fronting tier (Rooms 37-79, Fig. 24) but as was shown by the Glaze I skeletons found

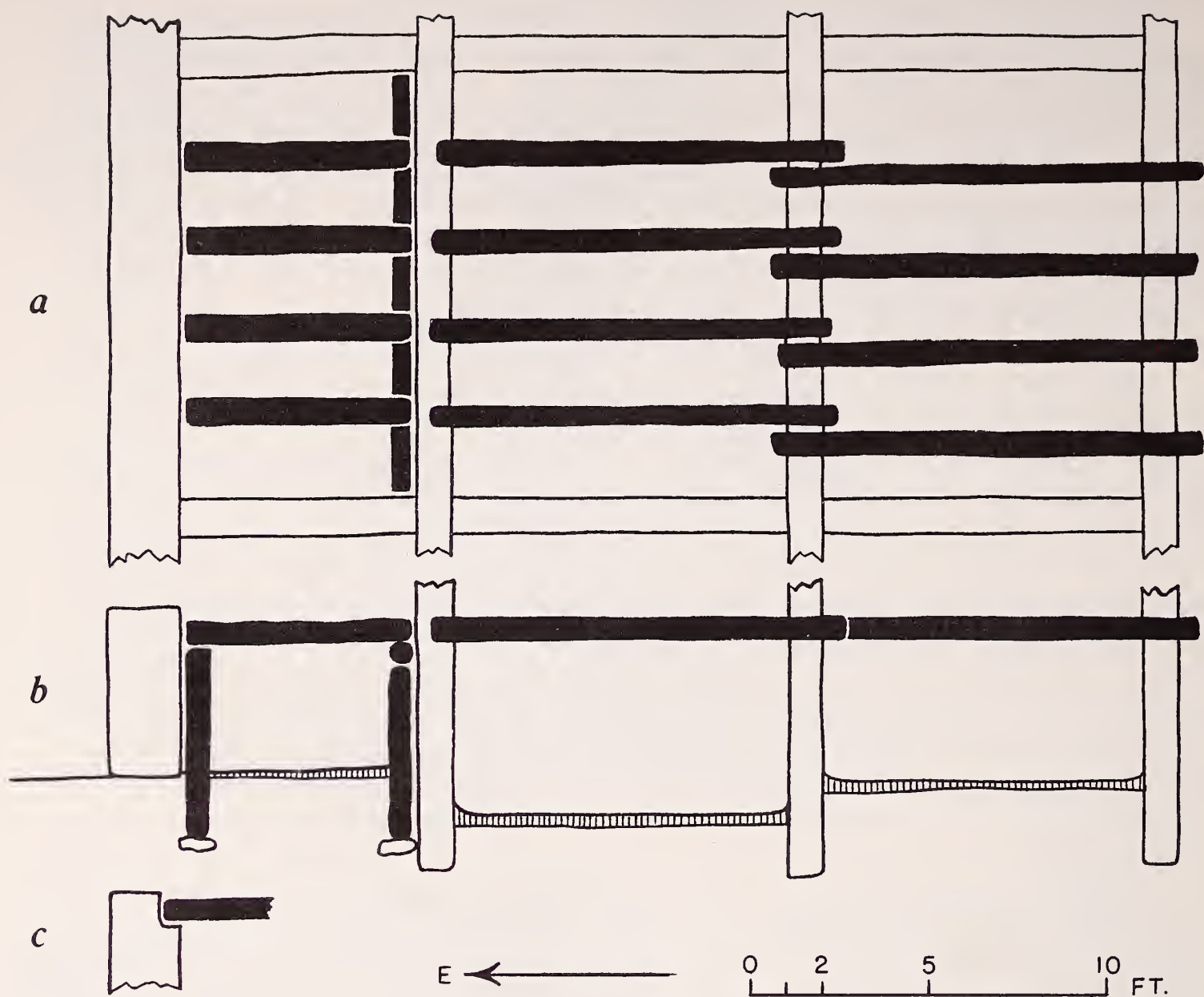


Fig. 29. Diagrammatic plan (a) and sections (b, c) showing method of setting first-story roof beams in the three-room-wide west side of Quadrangle. Beams, black; floors, vertical hachure.

in front (east) of it, its rooms, to repeat, were being used in that period. People also lived--and died-- in them during Glaze II, III, and the beginning of Glaze IV (Table II). But in the course of the latter phase the 56-52 tier was added.

The final building done on the west side of the Quadrangle was the addition of a single tier of very large rooms--or perhaps merely enclosures (Rooms 44-71, Fig. 24). These were put up toward the end of Glaze V, by which time the ruins of earlier structures, filled and covered by masses of refuse with many burials, had reached such a height against the vertical west wall of the Quadrangle that their floors were almost level with or above the ceilings of the Quadrangle's first floor (Figs. 26, 27). The same figures show that floors with fireplaces had been laid in them. They were walled, but whether they were roofed, and if so how, we could not make out. Posts in Room 27 suggest that some may have been, but their very large size makes it probable that any covering must have been light, perhaps of branches. The most likely guess is that they served as shelters for semi-outdoor activities, the fireplaces perhaps for cooking, perhaps for warmth in winter. Their final use was as corrals, for in each, the uppermost layer was packed-down manure. We found no doors through which animals could be brought in, but some part of the wall of each was broken off at, or close to ground level.

Roofing. The problem of the roofing of these large, late structures brings consideration of the roofing of the Quadrangle proper. As to this we gathered abundant data, the roofs of many first-floor rooms being still in place, although usually badly crushed down; and not a few of those of the second and third floors were found fallen, but in fair condition. The system was the same in all parts of the pueblo examined, for the space to be covered varied but little (Figs. 29-32).

As the plans show, most rooms of the Quadrangle were small and not far from square, being 10 or 11 feet long by 9 feet wide. Those of the west side that fronted on the plaza, were of the same length as those to which they had been added, but were seldom over 6 feet wide. Three very late rooms at the north end (50-52 in Fig. 24), although somewhat longer than the rooms behind them, were of about standard width.

The main roof beams, four to six in number and 5-7 inches in diameter, always spanned the shorter dimension of the room. We found only one case of beams being carried through to cross a second room (Fig. 34). The majority were of yellow pine. Across these were laid shakes of cedar (Fig. 31d) less commonly of pine (Fig. 31c) 4-6 inches wide, or small poles (Figs. 30c, 31a). Next, across these, again at right angles, were twigs of cedar, willow, or wild cherry, sometimes in leaf, or rushes (Fig. 30a, b), the whole topped by 2-4 or 5--sometimes as much as 8--inches of adobe, its surface nicely finished to form the floor of the room or gallery above.

The main beams were supported in various ways. Those of the west side's plaza-fronting tier were sometimes carried at their outer ends by an offset on the inner side of the heavy exterior wall (Fig. 29c), more

Table II

Black-on-white	5
Glaze I	
Glaze I Red	7
Glaze I Yellow	9
Biscuit A	<u>2</u>
	18
Glaze II	5
Glaze III	2
Glaze IV	5
Biscuit B (could be of either Glaze III or IV)	<u>3</u>
	38

Table III

Burials shown in Fig. 25, where serial numbers of those assignable to phase by mortuary pottery are underlined. (Ad., adult; adl., adolescent, 10-18; ch., child 3-10; inf. 0-3; m., male; f., female. Gl. I, Glaze I Red; Gl. IY, Glaze I Yellow; B.B, Biscuit B.)

Room 43

947, ad. m., Gl. III
 951, ad. f.
 954, ad. f., Gl. IY
 1302, ad. f., Gl. IY
 1303, ad. ?, Gl. IV
 1306, adl. m.
 1309, ad. f., Gl. I
 1311, adl. f.
 1316, ad. f.
 1317, ad. f., Gl. IV
 1318, inf.
 1319, ad. m., Gl. I-II
 1320, adl. ?, B. -W.
 1321, ad. m.
 1342, ad. m.
 1343, ad. m.
 1344, inf.

Room 43

1349, ad. f., Gl. I-II
 1352, inf.
 1353, inf.
 1359, inf., Gl. IY
 1361, inf.

North of Room 43

970, ad. m., Gl. IV

Room 44

1322, ad. m., Gl. III
 1323, inf.
 1324, ad. m., Gl. III
 1326, inf.
 1328, ch.

Room 44

1330, inf.
 1331, ad. f.
 1332, ad. m., Gl. I-II
 1333, ad. f., B.-W.
 1334, inf.
 1335, ch.
 1336, ch.
 1337, ch.
 1347, ad. m., Gl. I
 1358, ad. m.

Room 27

939, ad. f.

Room 32

942, ch., B.-W.

Room 33

948, ad. f., prob. Gl. I
 950, inf., B.-W.

Room 54

934, ad. m., B.-W.
 1151, ad. m., Gl. IV
 1152, ch., B.-W.

Room 55

1148, ad. m.
 1149, inf.
 1150, adol. ?, B.-W.
 1153, ad. f. B.-W.
 1154, inf.

Room 55

1155, inf.
 1156, ad. m., Gl. IV

Room 56

1179, inf.
 1181, ad. f., Gl. IV
 1188, ad. f.
 1189, ad. ?
 1190, ad. ?, B. B
 1191, ad. ?

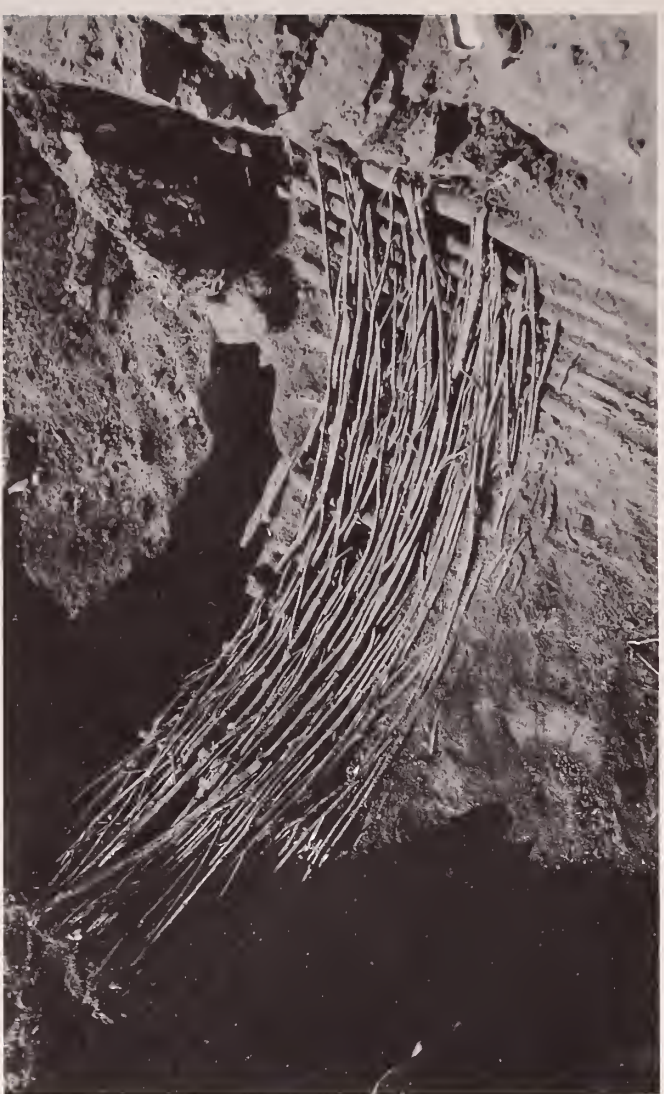
Plaza E. edge

1157, ad. f.
 1173, ad. f.
 1174, ad. m., Gl. III
 1177, ad. f.
 1178, ad. m.
 1180, ad. m., Gl. IV
 1611, adl. m., Gl. I
 1613, adl. m., Gl. I-II
 1616, inf.
 1618, ch.
 1622, ad. m., Gl. I
 1623, ad. f., Gl. III
 1625, ad. m.
 1626, ad. m., Gl. I
 1627, ad. f., Gl. III
 1629, inf., Gl. I
 1630, adl.
 1633, ch., Gl. III
 1634, ad. m., Gl. III
 1635, ad. f., Gl. IV
 1636, ad. m., Gl. III
 1644, ad. m.
 1649, ad. f.

often, on the tops of vertical posts (Fig. 29**b**). Their inner ends rested either on a masonry offset or, more commonly, on a room length beam set close against the inner wall and supported by two to four vertical posts (Fig. 29**a, b**). The latter two methods were necessary because the plaza-fronting rooms were late additions, their western walls being the finished, formerly easternmost, walls of the tier behind, so that beam-ends could not easily, or indeed safely, be let into the masonry, as was



a



b



c



d

Fig. 30. Roofing, west side of Quadrangle. a-d, northern part of basement roof, Room 75. Southern part rotted, north wall fallen north. West wall, in which ends of main beams were bedded, appears at right: a, three-inch layer of hard adobe that formed floor of room above removed to show crisscross layer of reeds; b, east-west layer of 3/8-inch willow (?) twigs; c, north-south 1 1/2- to 3-inch poles; d, east-west main roof beams.

Fig. 31. Roofing, west side of Quadrangle: a, part of basement roof, Room 20, before deep excavation; main east-west beam, secondary poles, tertiary rods; cedar bark and adobe final layers still uncleared under whiskbroom, before which were no rods; this gap and double secondary poles on either side probably indicate former presence of hatchway; b, remains of four stories, Room 26, uppermost an adobe brick half-wall on squared timber dated 1578±x years; c, split pine secondary elements, Room 32 basement, main beams embedded in west wall; d, split cedar secondaries in roof of second story Room 33; e, butt of cedar roof-support post, northwest corner, Room 27, a late addition. Note that post, like all vertical timbers at Pecos, was of cedar and was stepped on a stone slab to prevent sinking or rotting. Remains of Skel. 936, Glaze IV, in earlier deposit below post.



a



b



c



d



e

Fig. 32. Roofing and hatchway: a, great pine log, probably main roof beam, lying across Kiva 7; south wall of north building of Quadrangle beyond, with butts of posts that supported gallery; b, squared timber that helped bear "cellar" roof, Room 26; it has slipped off two of its supporting posts and broken over third; c, trap door in second-story roof, Room 33. Note, at upper right, rounded hinge-peg and fragment of casing in which it fitted. Similar peg at left hidden by casing.



a



b



c

done when walls were being built and roof beams set at the same time. In those cases, which of course obtained throughout most of the pueblo, the timbers had been bedded in the walls as their masonry was laid, the ends usually protruding a little into the next room, the ends of the latter's beams also passing through the masonry close beside, but not touching, those of the other room (Fig. 29a). In some inner ground-floor rooms, the beams, even when their ends were embedded, were given the extra support of a longitudinal timber set on vertical posts (Room 32-1, Fig. 26; Room 26-1, Fig. 32b).

Speaking of roof beams, it might be mentioned here that those embedded as just described served their purpose admirably as long as the pueblo was in good shape. When, however, any part of it was allowed to get seriously into disrepair they greatly accelerated its ruin, for the fall of any higher masonry generally pulled out one end of the beams below or broke them in the middle. In either case, they were canted so violently down that they usually pried out all masonry above them. And as beams always crossed the shorter dimension of a room, with ends embedded in its longer pair of walls, and as the long walls divided room from room in each section, they were far worse ruined than the shorter walls between the rooms of adjacent sections.

Doorways. The above explains our poverty of information as to doorways, because these normally opened only between rooms of the same section. Such data as we could recover from the few that remained intact and from parts of them in fallen walls indicate that all were simple rectangles. No tau-shaped examples were seen. They opened some 6-18 inches above the floor, were 18-20 inches wide and 28-32 high. Most had sandstone slab sills and lintels of three or four cedar rods, with their ends set into the masonry. The stone sill seems to have been left bare, but the jambs and lintel were built out and rounded with adobe, which somewhat reduced the size of the aperture.

It would seem that at times it must have been desirable to close a doorway, even between the lower rooms, whose walls were almost the only ones left standing for our study. But none had recessed jambs to hold a slab, or loops at top or sides for attaching a cloth or hide. When a doorway proved in some way undesirable, it was merely masoned up (Fig. 19b).

Hatchways. Because ladders served for so much up-and-down traffic throughout the pueblo, we were always on the lookout for specimens. Not even anything we could identify as a rung rewarded us. But of the hatchways that provided the only way to get from second floor galleries down into ground floor rooms and from floor to floor we found considerable evidence in the form of rectangular gaps in the rods or slats (Fig. 31a, c) of fallen roofs. These openings measured, on the average, about 30 by 18 inches. Most hatchways, of course, had to be located between pairs of roof beams, or between an outside roof beam and a wall. In such positions their length was not limited, whereas there was seldom even as much as 20 inches between beams or from beams to wall. Dominguez, describing Tesuque, a Tewa Pueblo in 1776, says,

"The ceilings are quite low. . . . They have a coi, and this is nothing but a gap opened in the floor of the upper dwellings between two beams for use as a trap door to give access to the lower apartment by a ladder" (Adams and Chavez 1956:50).

One disused hatchway, in the cellar roof of Room 18, was set across the line of beams. It was 22 inches in that dimension by 14 wide. Its former presence and size were indicated by reason of that space not being covered by the peeled rods which in this roof had been used instead of slats. The cellar had eventually been abandoned and the hatchway closed with short pieces of cedar laid crisscross and covered with adobe.

What served to close hatchways in prehistoric times is not known. Those in gallery roofs must have had to be shut in case of rain; also some in rooms, to conserve warmth or to cut off drafts. Stone slabs would have been clumsy; lacking metal tools, planks were surely laborious to make. I imagine that semirigid mats of thin sticks held side by side with a twining of string would have been satisfactory. Such mats have often been found in the cliff dwellings; a fine specimen from the Mesa Verde is illustrated by Fewkes (1920, Fig. 61).

An interesting trap door was found in the second-floor roof of Room 33, the hatchway having provided access to the gallery above. It was a nice piece of joiner-work, thin boards held in a frame of heavier pieces (Fig. 32c). It had certainly not been made before something more effective than stone knives and scrapers was available. As a matter of fact, there came to light in Room 27 the steel blade of a plane. The long dimension of this trap door had been parallel with the room's south wall, near the middle of which the door was situated. It worked on round extensions, one on each end of its southern edging piece; these fitted into holes in the frame.

The roofs and doorways just described were the same, as far as we could tell, as those throughout the late pueblo. Most of our data were obtained from the west side, which was, as has been said, but three ground-floor rooms wide, whereas the greater part of Building A and the entire South House were twice as wide, having been composed of sections with six ground-floor rooms. The west side may nevertheless safely be taken to represent the room arrangement of the whole pueblo because the longer sections were merely two short ones set back-to-back. Rightly or wrongly, I call both a complete short section and each one of the two back-to-back halves of a long section an apartment.

Rooms, Galleries. Description of a typical short west-side section will be clearer if its rooms and galleries are lettered (Fig. 33a). The outer ground-floor room, A, was primarily defensive. It not only presented a blank face to an attacker, but with the B and C rooms behind, it raised the living quarters out of easy reach, once light movable ladders were pulled up. The A room normally had a very heavy exterior wall, in or against whose masonry were set the vertical timbers that supported the gallery, G-II, above it. (Webster's [Unabridged, 1953 ed.] definition of "gallery" [1. A long and relatively narrow room, hall, or

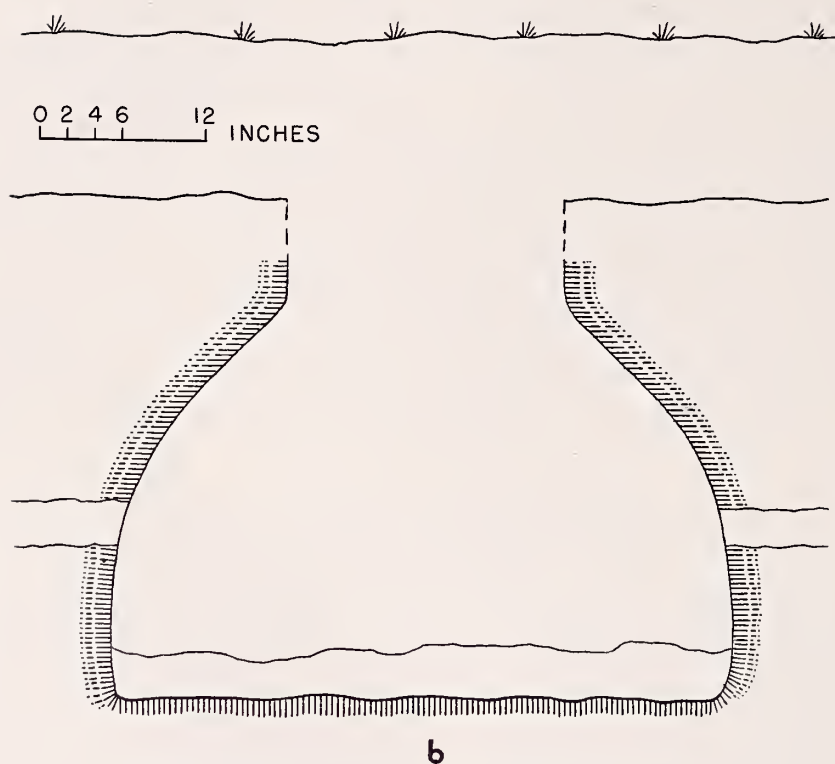
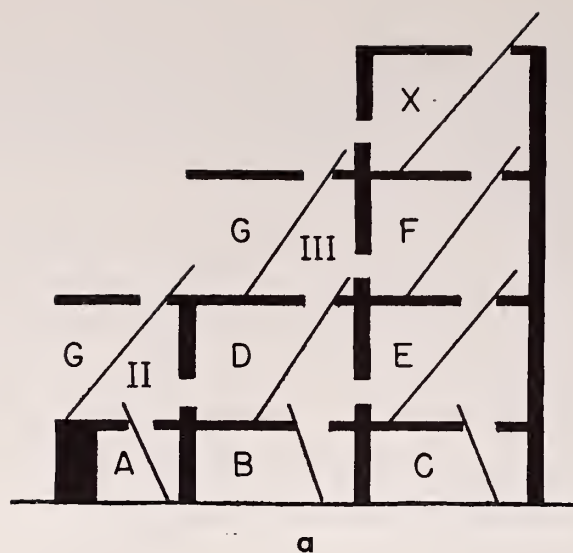


Fig. 33. a, diagram of an "apartment" or short section, three ground-floor rooms wide, in west side of Quadrangle. Long sections (Fig. 21) consisted of two "apartments" set back to back. Second- and third-story galleries lettered "GII," "GIII"; topmost room "X" because of doubt as to fourth story in all "apartments"; b, oven dug into compact midden. Contemporary surface just above mouth. Oven unlined, as proved by transected ash layer in midden running to inner face of wall. Earth of wall burned red, becoming black further out. Layer of charcoal on floor.

other artificial enclosure, esp., a covered space for walking, more or less open on the sides; . . .] best fits these continuous architectural elements open on one side.) This heavy wall was unpierced on the outside, access to the room behind being through a hatchway in the gallery floor (see vertical arrows in Figs. 26, 27).

The outer, A, rooms were very low-studded, none having as much as 5 feet of headroom, and were often reduced in size by a great heap of stones piled against the base of the rear wall (see Room 55-1, Fig. 26). Vaillant, kindly soul, never wishing to vilify even the worst of ancient jerry-builders, often courteously referred to such piles, I find in his notes, as "buttresses." The B rooms, directly behind the A's and often less low-studded, were, it will be remembered, the plaza-fronting rooms of the pueblo before the tier of A rooms was added. Their walls were founded directly on or closely adjacent to the remains of more ancient walls that had usually been built on bedrock (Fig. 28 and see west wall of Room 33-1, Fig. 26). Thus, they rose from a level considerably below that of the A tier. Their bases were often also strengthened and the size of the chamber lessened by heaped stones. The outer wall of a B room, no matter how much it might be buttressed, was actually thin and so differed radically from the usually massive outer wall of the A rooms.

The covered ways, termed corredores by Castañeda, anglicized as "corridors" by Winship, are, as I've said, more accurately called "galleries." None remained standing, but the fallen roofs of many were found in good condition. They were of the same construction as those of rooms--of beams, cross-slats or poles, brush, and adobe. The outer edge of the roof of the second-story gallery was supported by vertical timbers that were always associated with the heavy exterior walls of outside first-story rooms. Such timbers might be set inside, less commonly outside, the wall; most often they were incorporated in its masonry. All of them had rotted or been chopped off, generally below the former top of the wall. How the galleries were finished and just how their supports were placed we would not have learned had it not been for Guthe's acumen in grasping the meaning of and accurately recording certain fragmentary remains of a gallery and its woodwork, which, in 1920, he worked out in clearing Room 106, one of the few we excavated on the west side of the South Pueblo near its northern end. In no other subgallery room could at least a part of every timber be located, or so much of the floor and back of the gallery itself be studied.

In this case, the South Pueblo's western tier of rooms had the conventional heavy outer wall, here a triple construction (Fig. 34). First, were set six vertical posts, each of which was to bear the end of one of the six roof beams (z) of Room 106-1. Between them was laid tightly packed masonry. At three places (indicated by arrows in Fig. 34, lower) there were set, at about two-thirds the height of the inner or No. I wall, three longer vertical timbers (the level of their butts shown by horizontal arrow, Fig. 34, upper, the middle timber marked x). These rose to

carry, doubtless on a cross member, the outer ends of the gallery's roof beams. The inner surface of both masonry and posts was given a 6-inch coat of adobe, thus completing Wall I.

Apparently to shield the nine wooden posts in Wall I (six y, three x) and perhaps to strengthen the whole construction against outward pressure, another masonry wall (No. II) was built. This, however, was evidently not considered adequate and after sufficient time had elapsed for some 18 inches of rain-washed adobe with a few late Glaze V sherds to have accumulated against the base of Wall II, a heavy reinforcement, Wall III, was added. This and Wall II were continued south across the front of Room 108 and to an undetermined distance beyond. Wall I, at the north, abutted the corner of Room 105, whose outer wall was of the same masonry-and-post-and-adobe construction as Wall I of Room 106. The outer wall of Room 108, on the other hand, was of heavier masonry but had no adobe "lining." The sequence of room-building in this part of the South Pueblo was not clear, although it would appear that the block of rooms containing 106 and 108 had postdated, because it abutted, Room 105. However, the similarity of 105's outer wall and Wall I of 106, suggests a short interval.

If any long-suffering reader has followed me thus far he will believe that to get the underpinning under the gallery of Room 106 has taken me as long as it did the Pecos of Glaze V. And what with wrestling with the field notes and plans, the drawing of the present figures, and the struggle of writing the foregoing text, I think it very likely did. But my excuse is that, thanks to the accidents of preservation, the gallery at that one spot, possibly the only one in the whole enormous ruin, was still in shape to make clear to us how these extremely important elements of Pecos architecture had been incorporated into the pueblo and how they were finished off to serve what might well be called the "Main Streets" of the town. This gallery along the west side of the South Pueblo had a sheltered width of at least 7, more likely 8, feet and when Wall III was added, a total width of 10. It had a thick adobe-on-cedar-slat floor, not pierced by a hatchway, so that Room 106-1 below was entered from 107-1 by a lateral doorway. To the latter, access presumably was had by a hatchway. Its ceiling was so smashed by falling rear walls that this was uncertain.

Room 107-2 was entered from the gallery through a lateral doorway, as was probably the case with all second- and third-story chambers throughout the pueblo similarly fronted by a gallery. This at once raises the question of how many such chambers there were, in other words, what parts of the pueblo were served by galleries.

We know the west side of the South Pueblo, of which we have just been speaking, was so equipped, presumably along its whole length. So also were the buildings fronting on all four sides of the plaza, for Castañeda speaks of "corridors which are on the inside of the village." He does not state that they were lacking on the outer side, as of course they were on the narrow western side of the Quadrangle, which had a sheer western wall (Figs. 26, 27). But De Sosa, speaking of the dwellings, says

they were, "all connected by wooden corridors or balconies which ran from house to house throughout the village." This sounds like galleries on both sides and I feel that this was probably so in the case of all wider parts of the town because in the outer rooms of each of the two sections we excavated on the east side of the plaza we found the fallen beams of undoubted gallery roofs (see Rooms E-I-G, E-II-G, Fig. 35, there shown replaced). Furthermore, the outer, *i. e.*, eastern wall of each of those sections was of the same massive type, with incorporated gallery-supporting timbers as in the subgallery rooms (55-1, Fig. 26; 50-1, Fig. 27) of the Quadrangle's west side, and in the South Pueblo (Fig. 34). The massive wall, however, does not seem always to have been necessary, for the west wall of Room E-VI-1 was of single width, as was the east wall of B-VI-1 (Figs. 35, 36), although the former, being a plaza-fronting room, surely had a gallery above it; and in B-VI-1 there were vertical timbers that stood higher than was necessary to bear the roof beams of that room, and so were presumably gallery supports.

I have perhaps devoted an undue amount of attention to this matter of the galleries, but it bears on the accessibility and defensibility of dwellings in different quarters as well as on other aspects of the life of the town. Vaillant and I naturally discussed the problem at length with Moorehead when he was drawing his restorations of Pecos (Figs. 22, 23). That was in 1925, the last year that much work was done on the main Pecos ruin. But since then some excavation has been carried on in other large, late sites of the Upper Rio Grande. In none, apparently, has clear evidence of galleries come to light. And as far as I know, they are not specifically described except at Pecos in any early account of the pueblos. Castañeda, I think, only once, uses the term corredor for covered exterior structures. At other towns he usually refers to them as balcones. This would seem to imply less continuous shelters, perhaps serving single rooms or small groups of rooms. At all events, no galleries comparable to those of Pecos have existed at any pueblo in recent years.

One further point. Were galleries part of the original Glaze III plan? I think not, because the heavy-walled outer ground-floor rooms of the Quadrangle's west side ground floor are known to have been added not earlier than late Glaze III, more probably early in Glaze IV. Furthermore, it is certain that in the tier behind there had been no heavy outer wall, such as seems generally to have been considered essential under front-room balconies. The evidence in the E-Series rooms is less clear, but it should be noted that in the plaza-fronting room, E-VI-1 (Fig. 35), which had no heavy outer wall, it was necessary to put in extra supports under the gallery. In the B-Series (Fig. 36) the evidence again is not clear; but the building containing those rooms was erected during or after Glaze IV. As to the South Pueblo, there can be no doubt that galleries formed part of the original plan of at least its northern end, which may have been built and was surely remodelled in Glaze V. If further excavation is done at Pecos, a search should be made for evidence as to the time when galleries came into use. In the field, it never occurred to my pot-ridden mind.

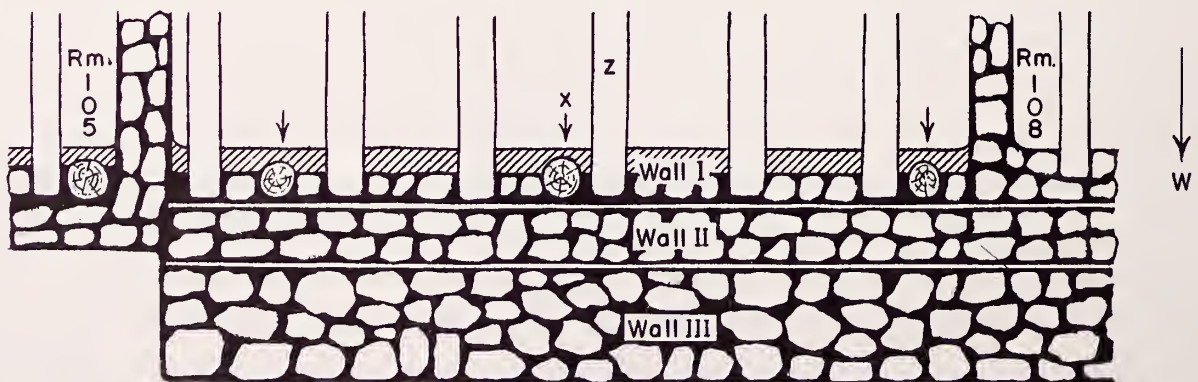
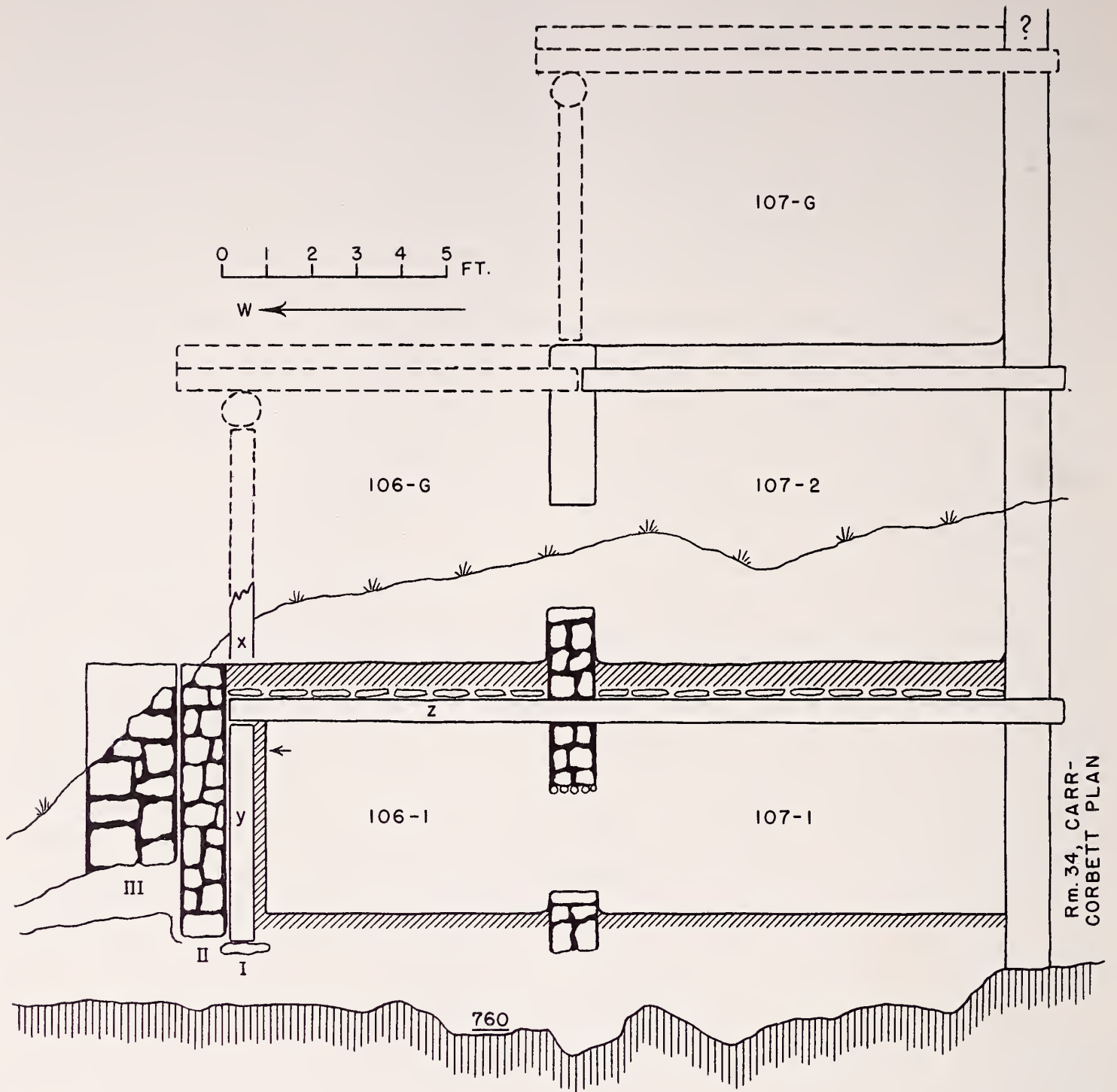


Fig. 34. Section through Rooms 106, 107, and plan of front of Room 106, west side of north end, South Pueblo, to show roofing of ground-floor rooms and support of second-story gallery. In section: y, one of six posts set vertically in masonry of Wall I to support outer ends of the six roof beams, z, which in plan rest on and hide tops of y, beams; x, one of three posts, marked by arrows in plan, that support outer edge of balcony; they are set well up in masonry of Wall I (level of their butts indicated by arrow in section). Roof beam z, in section, is only one found at Pecos to span two rooms. Cedar slats cross roof beams and bear adobe floor of gallery and Room 107-2.

The galleries rendered Pecos far more commodious and livable. To add them to an already terraced pueblo required no more than the strengthening of the outer wall of the outer ground-floor rooms and the setting in or against it of posts to carry the edge of the gallery roof. I have wondered, indeed, if the decision to give up the original westernmost rooms of the Quadrangle's west side and to replace them with a plaza-fronting tier may not have inspired some Glaze IV Frank Lloyd Wright to supply the new rooms with a continuous gallery. Its horizontal lines and functional qualities were in the Wright manner, but whether or not the galleries were, so to speak, an architectural second thought, there can be no doubt that the building of the Quadrangle was a community effort. Its strongly defensive nature was the culmination of a series of steps taken by the people of the Valley, perhaps joined by others from the country to the east, to protect themselves against increasing danger of attack. First had come concentration into fewer and fewer villages, then the gathering of the entire population into a single town on the steep-sided mesilla; but even there it eventually became evident that the dwellings themselves must be made less liable to hostile penetration.

The building of the Quadrangle, with blank ground floor walls and the use of retractable ladders, was the answer. This type of pueblo does not seem to have been a local evolution, but whether it was an independent Pecos invention or whether the idea was borrowed cannot now be decided, although I think that more intimate knowledge of northern Rio Grande archaeology may some day settle the question.

Returning to the west side of the Quadrangle, there is little to add, as the upper rooms had been so completely ruined. Minor problems as to floors, doorways, wall junctions, and so on are covered in the detailed field notes on the many rooms of the ground floor and second story which we excavated. These are on file in Santa Fe. Descriptions of conditions in some of its rooms have been published (Kidder 1924: 26, 29). As to its height or, as a matter of fact, that of other parts of the pueblo, we were unable to recover any certain data. In each excavated room we found remains of crushed down roofs, but in no case more than three. Nevertheless, we had one bit of evidence that there had been at least some higher construction. This was a short length of wall of mold-made adobes built on a squared timber that had been incorporated in a third story roof (Fig. 3**lb**). Although it was thus surely a fourth-story element, it was not a house wall, for it was shorter than the width of any room, and its outer edge was smoothly plastered; its other edge was rough, and I believe it had been a windbreak or part of an unroofed shelter (see the fourth-story windbreak walls in Fig. 23 and one at the extreme right behind which are two women).

Vaillant and Moorehead and I discussed the problem of a fourth story at length. It was evident that whether such construction formed part of a three-room wide building terraced from a court, as was the west side of the Quadrangle, or whether it surmounted the commoner six-room type of building, terraced from both sides, it probably would of necessity

have been relatively lightly built and, when fallen, readily accessible for firewood robbing. It is interesting, as bearing on the possibility of a lightly built fourth story, to note that Alvarado, apparently speaking of Taos, reported that "The houses have three stories of mud walls and three others made of small wooden boards." (Winship 1896:295).

On the west side of the Quadrangle, in some of the back or western tier of rooms (36-74, Fig. 24), which would have carried anything that might have existed above a third story, we encountered amounts of fallen building stones that we estimated, but admittedly rather roughly, to have been sufficient for the erection of the necessary walls. For these reasons, and because of the very definite statements of Castañeda and others, Moorehead has shown fourth-story buildings (Figs. 22, 23). I have also restored a fourth story (Fig. 27). Moorehead, however, compromised, Vaillant and I agreeing, by representing detached houses, rather than continuous tiers of rooms.

E-Series Rooms. We now move east across the Plaza to that part of the Quadrangle adjoining its southeast corner. Our excavations showed that both the earliest and the latest buildings there had set back some 20 feet west of the edge of the mesilla, which rose in three or four low natural steps from the East Terrace (Figs. 21, 35). Black-on-white and a little Glaze I rubbish had accumulated on the steps. In it were the very shallow graves of three adults and an infant: Skel. 1694 with a Glaze I-II bowl; 1695, the infant, just above; 1696, with a Glaze III vessel; 1697, period uncertain. None of these interments could ever have been as much as two feet below the surface.

The rooms of what we called the E-Series were much worse ruined than those on the west side of the Quadrangle. On the other hand, they were in better shape than those north of the east entryway and far better than the ones of the Quadrangle's south side. They were inhabited well into the historic period, as late pottery and objects of European manufacture were found in them. Some may even have been occupied into the 1800's, for none had fallen so completely into ruin as to have become dumping places for rubbish, as had rooms north of the east entryway.

Of the E-Series, Rooms E-I to E-VI inclusive constituted a typical transverse section, six ground-floor units wide (Fig. 35). Similar sections, as we learned by minor test diggings, made up most of the Quadrangle and practically the whole South Pueblo. The section in question was one of two that we cut through the east side of the Quadrangle south of the east entryway. The other (Rooms E-VII to E-XII) paralleled it some 16 feet--about two room lengths--to the south (Fig. 21). Like its northern neighbor, it had been built on the stubs of Black-on-white and Glaze I walls. At some time during Glaze II or possibly early Glaze III, two of its eastern rooms, E-VIII, IX but not the later-built easternmost room, E-VII had suffered from the severe fire mentioned above as perhaps due to enemy action, which may have led to the building of the more readily defensible type of pueblo that housed the Pecos from Glaze III onward. Much maize was consumed. The flames did not reach the E-I to

E-VI section, but deep in the eastern midden below this part of the ruin there was so much debris from burned walls and roofs that I imagine the conflagration must have been fairly extensive in the direction of the south-east entryway.

As the section of E-I to E-VI (Fig. 35) shows, every first-story room except E-III-1 and E-V-1 held cellar refuse. The higher rooms were terribly ruined. Practically all east and west walls above the first story had fallen, crushing down the roofs, even those of the first story. The beams, however, were still clearly distinguishable and so could safely be restored as could, with almost equal confidence, the fallen walls, for these had for the most part held together enough to justify, with the added evidence of the beams, restoring them in the drawing as if we had found them still erect.

The walls running north-south (i. e., the east and west walls of each room) had almost always fallen east, whereas the east-west walls had tended to fall north. The north-south walls in both this section and that of E-VII to E-XII were all abutted by the east-west walls. This was in general true of the Quadrangle's west side rooms (Fig. 24).

I find no notes as to trap doors, probably because the roofs were much more badly rotted and more broken than those of the west side. Although only part of one jamb of each remained, it was possible to see that there had been a lateral door with wooden lintel between E-II-2 and E-III-2, as well as one between the latter and E-IV-1. No accurate measurements were possible, but it could be made out that their sills, probably of stone slabs, had been well above floor level; their height seemed to have been 2 feet 6 inches or more.

It is evident that there had been Black-on-white rooms along the east edge of the mesilla. The stubby walls under E-I, II, III were of that period. The higher remains of early walls below E-IV, V, VI seem to have been built in Glaze I, but the state of smash there and the heavy fills of fallen building stones, together with the very precarious condition of what remained standing of the upper walls rendered it impossible to do more than get a test-pit in any one of the three western rooms down through the wreckage, the underlying red shale, and to bedrock. The restoration, however, is certainly not far from correct. It shows that the two western rooms--and the same was true of E-XI and XII in the southern section--were founded at a considerably higher level. This was pretty surely due to the greater amount of Glaze I and probably Glaze II, perhaps even early Glaze III, ruin that had to be built upon.

We found that an adobe brick construction of some sort, very likely a wing wall similar to the one shown in Fig. 31d, and so restored, had existed above the roof of E-III-3. There were even more adobes in the wreckage of E-IV-3. These I believe to have been from a structure carried by the stone walls of E-IV-3 (drawn in single line and with an interrogation point in Fig. 35. If that room did carry some kind of superstructure, the pueblo, seen from the east, would have looked to be five, and from the west four, stories high at that point.

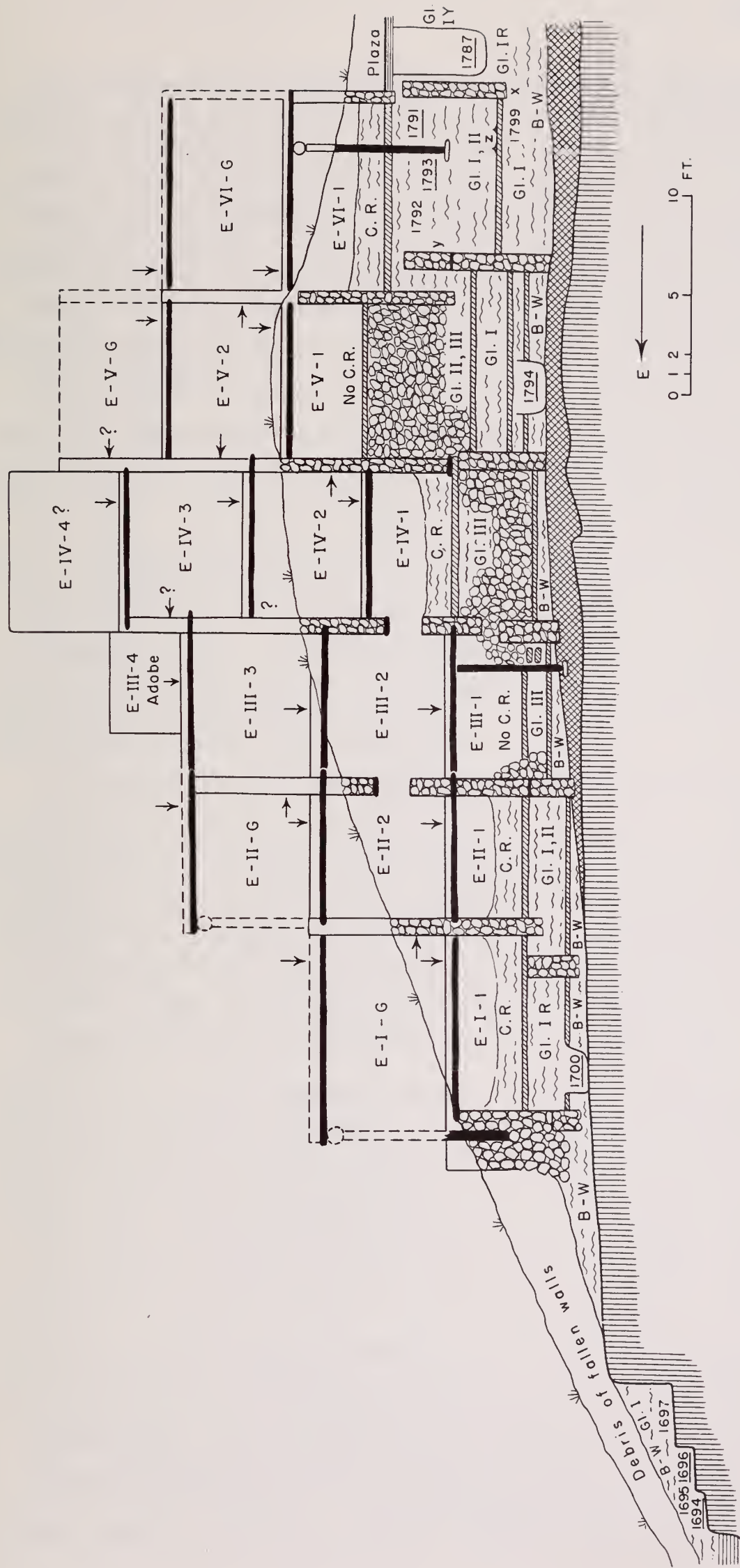


Fig. 35. Section through E-Series rooms, east side of plaza. Symbols as in Fig. 26. Note use of adobes under piled "buttressing" at west of E-III-1. In E-III-4 a probable wing-wall of adobe (Fig. 31b), which stood above the south wall and does not properly belong in this section through middle of room. Note heavy plank under west wall of E-IV-1: x, Biscuit A sherds; y, part of upper extension of late Glaze I wall; z, adobe-rimmed firepit. Presence and approximate former height of all roof beams ascertained; exact setting uncertain.

A piece of seemingly incredibly stupid building came to light in E-III-1, where an attempt had been made to support the tremendous weight of the "buttressing" of that room's west cellar wall with adobe bricks. Naturally enough, these had been crushed out of shape and the wall had started to sag. Apparently to remedy this, a set of three vertical cedar posts had been set through both early floors and into the firm shale to carry the west ends of the room's cellar roof beams. Possibly the solid fill of rock in the old room under E-V-1 to the west had been a further means of stabilizing this part of the pueblo. That this fill was made early, even if it was not, as I think probable, a matter of necessity, is shown by the fact that Glaze III sherds, but none later, were found among the stones (in Fig. 35, the adobes are shown as originally placed). Still another naive bit of construction was the founding of the west wall of E-IV-1 on heavy wooden planks laid on the cellar floor that extended onto the top of, but not clear across the old Glaze I wall.

Room E-VI-1 was founded at the level of the Glaze III plaza. Its roof beams, which carried the gallery above it, probably rested on the top of its west wall. That wall had no solid footing, a fact of course known to its builders. Probably because of that and also because the wall was of single thickness instead of the massive double construction east of Room E-I, at the other end of the section, it was felt necessary to shore up the roof beams. This was accomplished by sinking three vertical posts, presumably topped by a north-south beam well into the old rubbish-filled room that lay below.

The old room just mentioned was full of Glaze I and II refuse on which the floor of E-VI-1 was laid. The floor of the lowermost room was built on Black-on-white refuse topped by some of early Glaze I Red. As there was a fireplace (z) on that floor, it is clear that no room could have been built above it. Its original construction must have been in Glaze I, as a Biscuit A sherd was found directly below its west wall (x in Fig. 35). A burial (Skel. 1799, eld. f.) with no accompanying pot lay in the upper part of the refuse.

I think it likely that the lower part of the rubbish-filled room's east wall was once part of the west wall of the oldest Glaze I pueblo, and that the piece of wall (y) above it and the wall to the west, as well as the floor with the firepit (z) between them, are remains of a room in a tier added late in Glaze I. High in that room were three burials: Skel. 1791, adolescent male, with a Biscuit A bowl; 1793, elderly male, with one of Glaze II; Skel. 1792, near them, was that of a young adult, probably female.

Practically on bedrock below E-I-1 was the burial in Black-on-white refuse of a baby (Skel. 1700) with a large fragment of a Glaze I Red jar. The grave appeared to have been cut through the floor of an abandoned Black-on-white room. Cut through the earliest floor below E-V and a little into the underlying red shale was the grave of an elderly female (Skel. 1794) with a late Black-on-white bowl.

Outside the west wall of the section was the grave of an elderly male

(Skel. 1787, Gl. V bowl). It was one of the deepest burials found at Pecos, having been sunk nearly 5 feet from the Plaza level.

Among the finds in this section were a large Modern Painted bowl (Kidder and Amsden 1931, frontispiece), a double-lobed polished black vessel (Kidder and Shepard, Fig. 249j) with scraps of copper, iron nails, and bits of china, all in E-I-1. The cellar refuse there and in rooms to the west was as usual full of rotted organic matter and the bones of animals, native and domestic. Among the latter were a great many of horses including, in E-VI-1, a skull broken open to extract the brains. Nelson (1916, *passim*) also found quantities of horse bones in the late rooms of the Galisteo Basin ruins.

In the southwest corner of E-II-2, apparently in a cist in the adobe floor, was a cache: two strange little pieces of pottery resembling feed-troughs for poultry (Kidder and Shepard 1936, Fig. 253a, c), a small dark-ware jar with handle, stone and shell beads, and squash seeds.

B-Series Rooms. In order to determine its age in relation to the Quadrangle proper and to learn something of its architecture, the long, high-piled ruin that extends south from the southwest entryway was cut through from west to east about midway of its length (Fig. 21). It proved to consist of transverse sections six ground-floor rooms wide, similar to those of the E-Series. One of these, Rooms B-I to B-VI, we excavated to bedrock (Fig. 36).

The question of age was easily settled. Glaze IV sherds were found beneath its floors. No pottery older than Glaze V, save a few casual sherds, came to light in the rooms. I think, therefore, that this extension was added at the end of Glaze IV or at the beginning of Glaze V, probably the latter, for no provably Glaze IV burials occurred in the dense cluster just outside the west wall, and we know that it was customary at Pecos for at least some interments to be made close to their dwellings by the people of any given period. There were, however, several high-level graves in the cluster (Skels. 1415, 1436 and others). Some of these had Glaze V sherds in their graves and the fact that none was accompanied by mortuary pottery adds to the likelihood that they were of that period, during which vessels were seldom buried with the dead. Below them, on or close to bedrock, were graves provably earlier, not only than those just mentioned, but also earlier than the western B-series rooms, for an impacted stratum, presumably a former living surface, passed unbroken over them and under the walls of the rooms (x-x, Fig. 36). The burials, all of elderly adults, were of Glaze I Red (Skel. 1443), Glaze I Red or Yellow (a Biscuit A bowl, Skel. 1445), and Glaze III (Skel. 1410). The presence of so many early graves so close together led me to expect an early wall just to the east, but none was encountered.

So much for conditions west of the B-series. The extension of the Quadrangle, of which these rooms formed part, had been built on a bed some 3-4 feet deep of well-stratified refuse, Black-on-white, Glaze I Red, Glaze I Yellow. Above was a sparse sprinkling of Glazes III and IV. The midden under the western rooms, B-I to B-IV, had been laid down on

smooth, level bedrock, which ended below B-V and B-VI in great rocks that had split from the edge of the same ledge as those under the easternmost tier of the Quadrangle's west side (Rooms 56 to 52, Fig. 24; and see Figs. 26, 27).

The extension, to repeat, was of late construction. The section we dug differed from those in the Quadrangle proper in that it was underlain by practically no early walls. The only ones we found were of a single room that Vaillant and I thought to date from the later part of Glaze I, probably the final subperiod, Glaze I Yellow. The east and west walls of B-V were upward continuations of these walls, their masonry being greatly inferior.

It will be noticed that in the sectional drawing (Fig. 36) no roof beams are shown. This is because there were in these rooms only a few rotted bits of main timbers and some slats. We lacked, therefore, the remains of roofs that were present on the Quadrangle's west side and in the E-Series, which, although crushed down by the weight of fallen masonry, were sufficiently well preserved to enable us to make out not only the number of stories but also many constructional details.

I can see no reason to blame this condition entirely to decay, for the rooms were occupied into the historic period. Nor, as they appear to have continued in use into the years of shrinking population, would one think beam-robbing for new construction to have been necessary. This is one of the many unsolved problems I have run across in putting the present paper so tardily together.

Because of paucity of evidence as to roofing, our reconstruction cannot be as confident as it might, but what was left of walls stood rather better than usual and the amount of stone that choked the ruin was amply sufficient to have carried the building to the presumed three stories. It should be noted that we found no trace here of moldmade adobes. How early the Pecos took to using these, except under direction of the padres in the Mission, I do not know. Those we noted in the Quadrangle proper were in obviously very late construction.

I have postulated galleries over the first- and second-story rooms on both east and west. At the west, the outer wall, as in other parts of the late pueblo, was of double thickness, heavily buttressed, and backed by vertical posts. The easternmost room, however (B-VI-1), had only a single wall, but with the seemingly inevitable posts. All ground floor rooms were conventionally low-studded; I find notes of cellar refuse only for B-V-I and B-VI-I.

The B-Series showed three doorways. All opened between rooms in the section, none into either adjoining section. We could find no evidence of any opening through the wall between B-III-1 and B-IV-1, although it stood fairly well. This might be an indication of division of the section into east and west "apartments." The doorways were of the usual rectangular form, opening from a few inches to nearly 2 feet above the floors. When well enough preserved for measurement, they were about 2 feet 8 inches high; had stone slab sills, cedar lintels, jambs rounded with adobe.

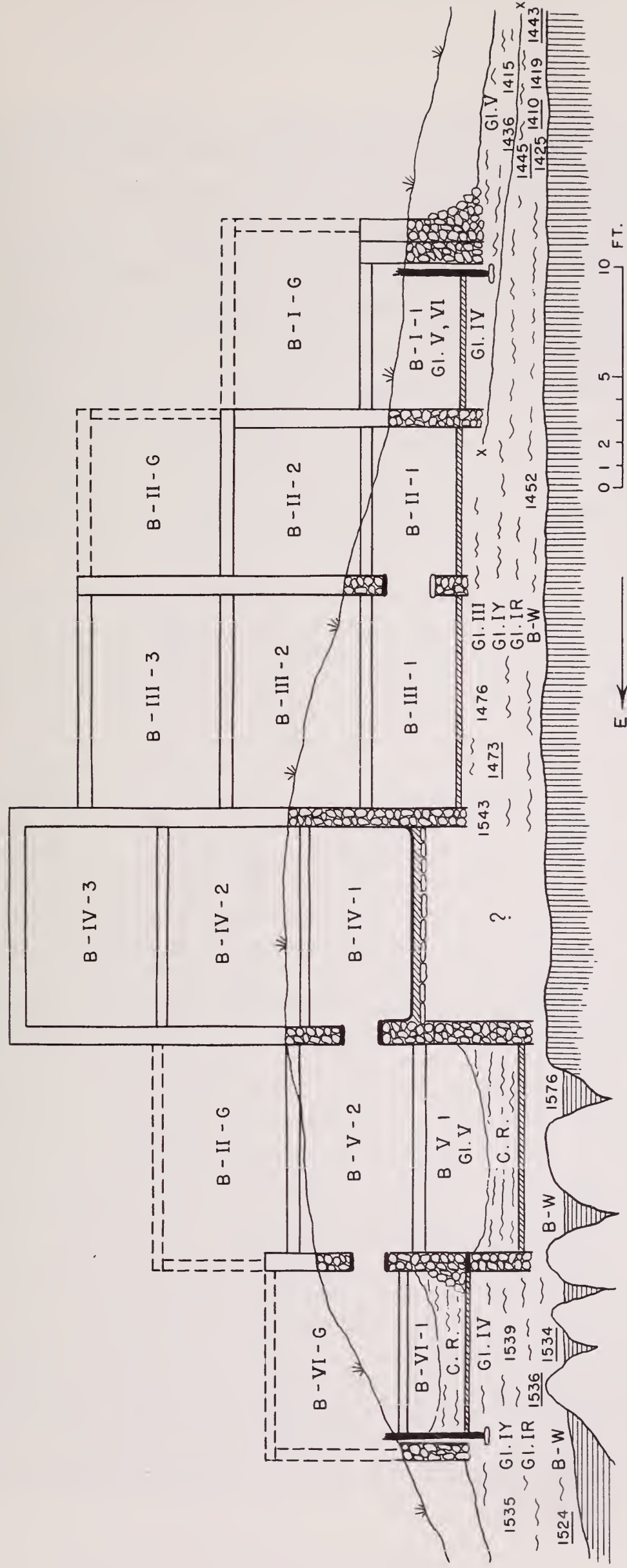


Fig. 36. Section through B-Series rooms south of Quadrangle. Symbols as in Fig. 26, but data not sufficient to show roof beams in black. Note paved floor of Room B-IV-1. Line x-x an early living surface. Stone slab sills of B-V-2 doors wrongly shown as wood.

Room B-IV-1 was paved with flat river cobbles, a few sandstone slabs, and a worn metate (Fig. 19f). The brown plaster of the wall ran out over the couple of inches of adobe that covered the pavement. An adjoining room that we excavated to the north was also paved.

B-IV-1, it will be seen, was set higher than any other. I find no notes on what was below, but as I stated that we went to bedrock, it is evident that there was no construction, nor any burial save, under the west wall, where we found Skel. 1543, a young female with no mortuary vessel; Skel. 1473, a very old woman with a Glaze III bowl lay close to the west. Between the first of the detached rocks and the ledge, under Room B-V-1, was the burial of a baby of about 18 months (Skel. 1576) that had been dug into Black-on-white refuse. Glaze I Red sherds were in the grave. A number of other graves were found under and east of B-VI-1; datable by mortuary pottery were: 1534, adolescent male, Glaze I Yellow; 1536, adolescent female, Glaze II; 1524, elderly male, Black-on-white.

Almost nothing in the way of artifacts was in any of these rooms, which, together with the possible robbery of beams, suggests abandonment before other parts of the pueblo were given up. No surely very late pottery is mentioned in the notes. Of Spanish origin, however, was a small copper cross from the floor of B-I-1.

South Pueblo

This long structure, Bandelier's Building B, parallels the eastern edge of the mesilla south of the Quadrangle and north of the Mission. For most of its some 460 feet of length it evidently had consisted of the typical transverse series of rooms, six wide on the ground floor. We did relatively little on it, merely clearing a few rooms toward its northern end in 1920 (Kidder 1924:25) and in 1924 we excavated one of the six-room sections: Rooms 39, 62, 66, 67, 79, 82 of the Carr-Corbett plan, a photostat of which has kindly been supplied me by Mrs. Marjorie Lambert. A much more extensive excavation was made with Civilian Conservation Corps (C.C.C.) labor in 1939 in order to clear rooms for display in connection with the Coronado Cuarto Centennial Celebration of 1940. Most of this was done by Dr. and Mrs. John M. Corbett and some, on the pueblo, by Mr. William Witkind, whose principal task was the clearing and mapping of the remains of the Mission's convento. It was a hurry-up job, there was no time for study of the material, nor for preparation of a report. It is much to the credit of the participants that any records at all were kept. I have not thought it fair to these gentlemen to use data gathered under conditions so unfavorable. Fortunately, there remain some undisturbed rooms south of the fourteen or so sections they cleared and which G. Carr and Corbett mapped. Also there probably remain some underfloor deposits.

The small amount of investigation by Phillips Academy at the north

end showed that part at least of the area ultimately occupied by the South Pueblo had been built upon in Glaze I and II times. This was indicated by sherds in the masonry of certain wall stubs and in refuse below floors as well as by the location of burials accompanied by Glaze I and II vessels. But there was no significant deposit of Black-on-white sherds either beneath the rooms or in the eastern midden, where refuse from the South Pueblo would naturally have been dumped. There were, however, two Glaze III burials below room floors and several in the East Terrace just within the defense wall opposite the north end of the South Pueblo. It seems therefore that there had been some Glaze III houses, perhaps pre-Quadrangle, somewhere in the vicinity.

All in all, I am pretty much up a stump regarding the history of the South Pueblo. The just-mentioned remains gave me the impression that the area had been sparsely occupied in the first two Glaze periods and then abandoned until into the historic period, when the present pueblo was built. There were sherds in such positions as to suggest a remodeling, if not an actual rebuilding, in Glaze V. They occurred, for example, against wall bases, even under the bases of certain walls which, however, may have been late additions. I thought, therefore, that most or all early dwellings of the South Pueblo had been given up and been robbed of much stone, so that by 1540 they had become no more than low mounds. Only so could I account for Castañeda's failure to mention anything but the Quadrangle in writing of the Pecos of the mid-1500's. Also, de Sosa's description of his capture of the town in 1590 seems to imply that he had the defenders of but a single structure to cope with. Thus, these now conspicuous ruins I considered to represent a structure that probably did not come into being until toward 1600.

Everything seemed simple enough until 1935, when I received from W. S. Stallings, Jr. his dendrodates from the north end rooms we had dug and from some adjacent quarters. There were no less than twenty-seven readings from beams that showed cutting dates. Surprisingly, they were all in the 15th century and varied only between 1433 and 1449, most of them having been cut in 1444.

Here was a poser, for I was convinced, and still am, that the great rebuilding could not have taken place before the beginning of Glaze III. But a date well before the middle of the 1400's seems very early for Glaze III, a period I originally believed to have opened about 1475. However, Wendorf (personal correspondence) thinks that it may go back to 1450. On the other hand, there was relatively little Glaze III refuse in the midden to the east and practically no Glaze IV in such trenches as we dug. It is, of course, possible that the north end beams yielding these dates were taken from an earlier building. Their cutting dates are not only more closely clustered than one would expect a robbed lot to be, but the beams themselves seemed too clean and well preserved to have come either from an abandoned early ruin or to have lasted in such fine condition in a building that I originally believed to have been in ruins from Glaze II until Glaze V.

The foregoing paragraphs regarding the South Pueblo were written early in 1956, at which time, as so often before, I laid before Stanley Stubbs my puzzlements as to that and other structures at Pecos. As usual he came most effectively to my assistance. He enlisted the aid of Terah L. Smiley of the Laboratory of Tree-ring Research, who came from Tucson to join him in attempting to secure further dendrochronological material from the South Pueblo and other parts of Pecos as well as from Forked Lightning. Stubbs was also helped by his colleagues, Fred Wendorf and Bruce T. Ellis, with whom he made tests in previously undug southern rooms in the South Pueblo. Their important finds in Kiva 7 and in the remains of a mysterious ecclesiastical building--the so-called "Lost" church--northeast of the main Pecos ruin will be told of later.

In the South Pueblo their hope was to find rooms which might have been burned and so have yielded datable charcoal. In this they were not successful, nor did any pine or pinyon roof beams remain in place, although a few rotted specimens were recovered and taken to Tucson for study. There were many upright posts, but as elsewhere at Pecos all were of cedar, which is not datable.

The testing in the rooms indicated a late occupation with considerable repair and remodeling. Adobes, evidently from upper stories, occurred in the fill of all ten rooms tested and in one, over an original mud floor, was a second floor of adobes, identical in size and color to ones found in the "Lost" church. This, as will later be explained, serves, in the opinion of Stubbs, with whom I agree, to date the floor at 1680 or very shortly thereafter. The sherds in these rooms also indicate lateness, being of Glazes V and VI and Tewa Polychrome.

Complete excavation of a sizable portion of the South Pueblo, with examination of subfloor deposits such as probably exist in at least some of the rooms cleared by Corbett but which he was not allowed to dig, would doubtless make clear the history of this interesting building. Stubbs thinks it likely, and again I agree, that Stallings' above-quoted dates in the middle 1400's are from beams of a Glaze II-III building, but that the pueblo of that time was possibly only one or, in places, two stories high and not as extensive in ground plan as the present mound. Later, (1600-1700) he considers, upper stories were added, the structure of course being correspondingly widened. I feel that Stubbs' hypothesis may well explain why Castañeda and de Sosa mention only the Quadrangle, for low and perhaps discontinuous structures would have failed to impress them. They might possibly, not even have been inhabited, for I have record of practically no Glaze IV burials there, nor of significant amounts of Glaze IV refuse in the midden below on the east. In any case, if Stubbs and I are right in supposing that the South Pueblo of 1540-90 was neither extensive nor high, the Pecos would have gathered to resist de Sosa in the more easily defensible Quadrangle.

In its final form, the South Pueblo contained, as nearly as can be made out, 28 or 30 transverse sections. There were some larger, longer rooms at the north; at its southern end, were three apparently

similar rooms. The main body was surely terraced on both east and west sides, rather than stepped up from the east to a vertical west wall standing four stories in height, as Bandelier supposed (1881, Pl. III, Fig. III). This error, also repeated in some of his east-west restorations of the Quadrangle (his Pl. V), was due to a natural belief that the west walls were so built as protection against the often fierce west winds. It must, however, be remembered that Bandelier did no digging. His report is painstakingly full; almost every one of his conclusions is correct, this matter of the west wall being his only mistake of any consequence. It is no less than astounding that he was able to accomplish such a survey in ten days, one of which was devoted to the western mesa, another to the modern village of Pecos. And the completed manuscript, together with all the drawings, was mailed from Santa Fe ten days after he left Pecos! The only comparable example that comes to mind of a similarly thorough, accurate, and rapid field study is that of the Maya cities so briefly visited by W. H. Holmes in 1895. There were giants in those days!

So much for the South Pueblo. Notes on and plans of the north end rooms and the single section we excavated are in Santa Fe. As the terrace to the east of it had no depth of soil, kivas could not be sunk into it and all indication is lacking that any was built above ground there or to the west, where the rock was either bare or very thinly covered with soil. The only structures on that side between the South Pueblo and the western defense wall were some low mounds, the remains of small groups of rooms that must date from late times, as most of their walls were of mold-made adobes (Fig. 37c).

Late Construction

There is no evidence that mold-made adobes were used anywhere in the Southwest before Oñate colonized New Mexico in 1598. At some prehistoric sites, however, walls were made of hand-shaped balls like those described by Castañeda in the passage quoted above. Jeançon records and illustrates such balls from Po-shu-ouinge (1923, Pl. 6a, b). Roughly rectangular blocks, more or less uniform in size, but modeled by hand rather than cast, were noted by Fewkes in Cliff Palace on the Mesa Verde (1911: 30).

Morris (1944) describes and figures a kiva wall of adobes and a section of the blocks. The find was made at a ruin built about A.D. 1100 near the great Aztec pueblo. The adobes were handmade, nearly equal in width (3 1/2-5 1/4 inches) and of even more nearly equal thickness (2 1/2-3), but varying in length (5 1/4-12). They were laid in true courses, every fourth of "headers." Being untempered and of a clay that dried very hard, a great many had been ruined by cracking. The resultant fragments were used in the hearting of the wall. Morris says, "...had not the experiment which produced them not been adjudged a failure, brick-

Fig. 37. Adobe construction, oven, chimney: a, walls of convent at Mission, plan rendered temporarily visible by adobes briefly holding moisture after rain; b, adobe pavement east of Room 37, west side of Quadrangle (Fig. 39). Along right edge, stubs of posts that probably supported gallery. Top dressing of puddled adobe and part of adobe mortar removed for photo. Kiva 14 below at right; c, base of wall of adobes in low mound west of South Pueblo; d, floor and lower part of wall of oven, diam. 52 inches; e, pot-topped chimneys, Zuñi, 1920.



a



b



c



d



e

making as a source of building material....would soon have come into vogue." He believed that, if so, form-moulding would shortly have followed.

Neither balls nor blocks appeared in the Pecos Valley ruins, or at Pindi.

The Pecos could have been taught to mold adobes by Mexican Indians who remained in New Mexico when Coronado left in 1542, for the practice had been known in Central Mexico since well before the Conquest. I found no indication of this at Pecos and adobe-making for Spanish buildings, especially Mission churches early in the 1600's, may have brought to the Indians of the Upper Rio Grande their first knowledge of this method of utilizing a material that had been serving them in many other ways from remote times.

The conditional mood of the foregoing is due to my feeling that the prehistoric Pueblos had probably long been learning by hearsay, if not indeed in the course of trading trips far to the south, a great deal about what was going on in Mexico. If they were as conversant as I suspect with Mexican crafts and ceremonial patterns, their failure to be influenced by them to nearly so great a degree as seemingly were certain peoples of south-central United States, tends to strengthen belief in the inherent impermiability of Anasazi culture to outside stimuli.

Be that as it may, the Pecos do not seem to have taken to using adobes for their own purposes until nearly a century after their labors on ecclesiastical structures had made them all too familiar with molding them. If I am right in this, we have an even stronger proof of Anasazi, or at least Pecos, conservatism. The reuse of adobes is perfectly practicable, as Mr. Nusbaum employed many from its fallen walls in his repair of the Mission. This recalls a story I heard at Pecos, which so far as I know, has not been recorded, that in spite of warnings by their priest, the walls of the nave had served the local Mexicans for years as a mine for these well-seasoned building blocks. The destruction had nearly reached the transept, when it was abruptly stopped for good by the violent death of one of the diggers, struck by lightning while engaged on the work of desecration. But for this, the entire Mission would presumably have been leveled.

To return, as the French say, to our muttons, adobes were found in the pueblo only in very late structures, for example, in a terrace paved with them (Fig. 37**b**) and in a number of walls at the southwest end of the Quadrangle, as well as in some of the E-series rooms (Figs. 35; 38**c**). The fourth-story half-wall of adobes above Room 26 had been laid on a squared timber (Fig. 31**b**). A second squared timber helped support the cellar roof of the same room; two other such timbers were set as posts in the floor of Guardhouse Kiva I, a chamber one of whose walls was of adobes (Fig. 62). Bandelier noted such of these occurrences as were visible in his day (1881:74); and at the north end of the South Pueblo (*idem*: 55) he observed some now fallen third-story walls "patched" with adobes about half as large as those in the Mission, i. e., 11 by 6 inches,

but made no note of their thickness.

The size of the Mission adobes Bandelier states (p. 43) to be 22 by 11 by 3 inches, duplicating most of the measurements made by Nusbaum and me in 1915. There were also, in the Mission, a few adobes 20 by 10 by 3, 21 by 10 by 3 1/2, and some 18 by 10 by 3 1/2. Those in the southwest rooms of the Quadrangle and in the wall along the southwest entryway were 21 by 9 by 3, some 19 by 9 by 3. The adobes of the Room 26 half-wall were 18 by 8 by 3; they were, as always in adobe construction, carefully coursed and the joints broken. There were layers of dark mud-mortar 1 1/2 - 1 3/4 inches thick between courses, the units in each course being separated by 1/2 - 3/4 of an inch of the same.

Colonial adobes, according to Kubler (1940:25) averaged 18 by 10 by 5; those made today, 16 by 8 by 4. Incidentally, the prehistoric Southwestern building stones that were brought most nearly to uniform size had been shaped from the easily worked tufa of the Pajarito Plateau. At Puyé these measured roughly 18 inches long by 8 or 10 wide and thick and their dimensional regularity led to definite coursing, but not to breaking joints or tying corners (Morley 1910:4).

The repeated association of moldmade adobes and squared timbers in the pueblo suggests that those parts of buildings in which they occurred were constructed after the Pueblo Revolt. And although I found no conclusive evidence to that effect, I think it probable that they date from the 1680-92 interval when the Spanish were out of the country. As will be brought out in Appendix III, the problem of the dates and sequence of Mission churches at Pecos is a vexing one. It bears on both the time of use and the source of the adobes and squared beams found in the pueblo.

Defense Wall

This circumvallation, as Bandelier so elegantly terms it, surrounded the entire pueblo. Beginning and ending at the Mission, it topped for almost the whole of its great length, slopes more or less steep, down which most of its stones had become scattered as it disintegrated. Nevertheless, a fairly reliable estimate of its original height could be made where it had traversed the flat narrow neck of the mesilla north of the ruins. There the stones lay as they had fallen. We accordingly rebuilt the wall across that stretch. It proved to have stood to not much over 3 feet, 6 inches, which accords with Castañeda's description of it as "low."

I failed adequately to study and take notes on the wall. But in 1915 Lothrop recognized a short piece of the base of an earlier one, built when the East Terrace was narrower and lower than it finally became. This was found in excavating Kiva I (Fig. 51). Lothrop and I believed we could make out traces of it in two other trenches that crossed the East Terrace north of Kiva I; however, the midden in each of them at the proper level had been greatly disturbed by grave shafts and contained much stone which might or might not have formed part of the wall. The following

Fig. 38. Structural details: a, salvaging smashed chimney pots, fallen from upper story, Room 75, before digging deeper and risking collapse of shaken masonry by moving broken timbers; b, Excavating remains of older rooms below Guardhouse Kiva J, whose floor was at level of base of masonry cutting across northwest corner (see Fig. 64). On part of floor left on unexcavated block are remains of J's firepit and deflector; c, wall of adobes, west side of Room 37, founded on stone wall of earlier room. North jamb of doorway into unexcavated room. Floor of Room 37 was at level of top of masonry, men cleaning latter for study.



a

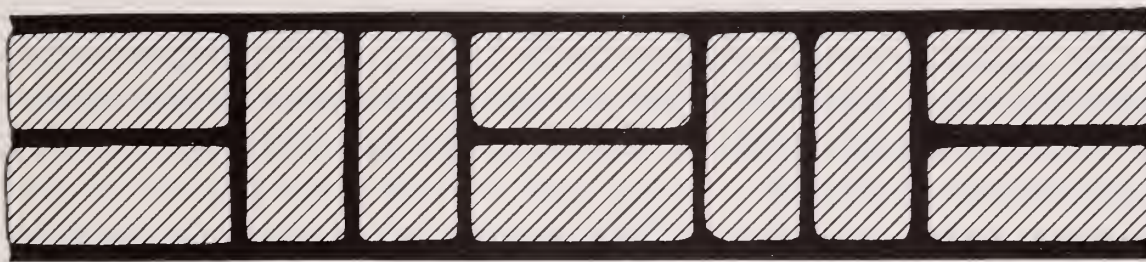


b

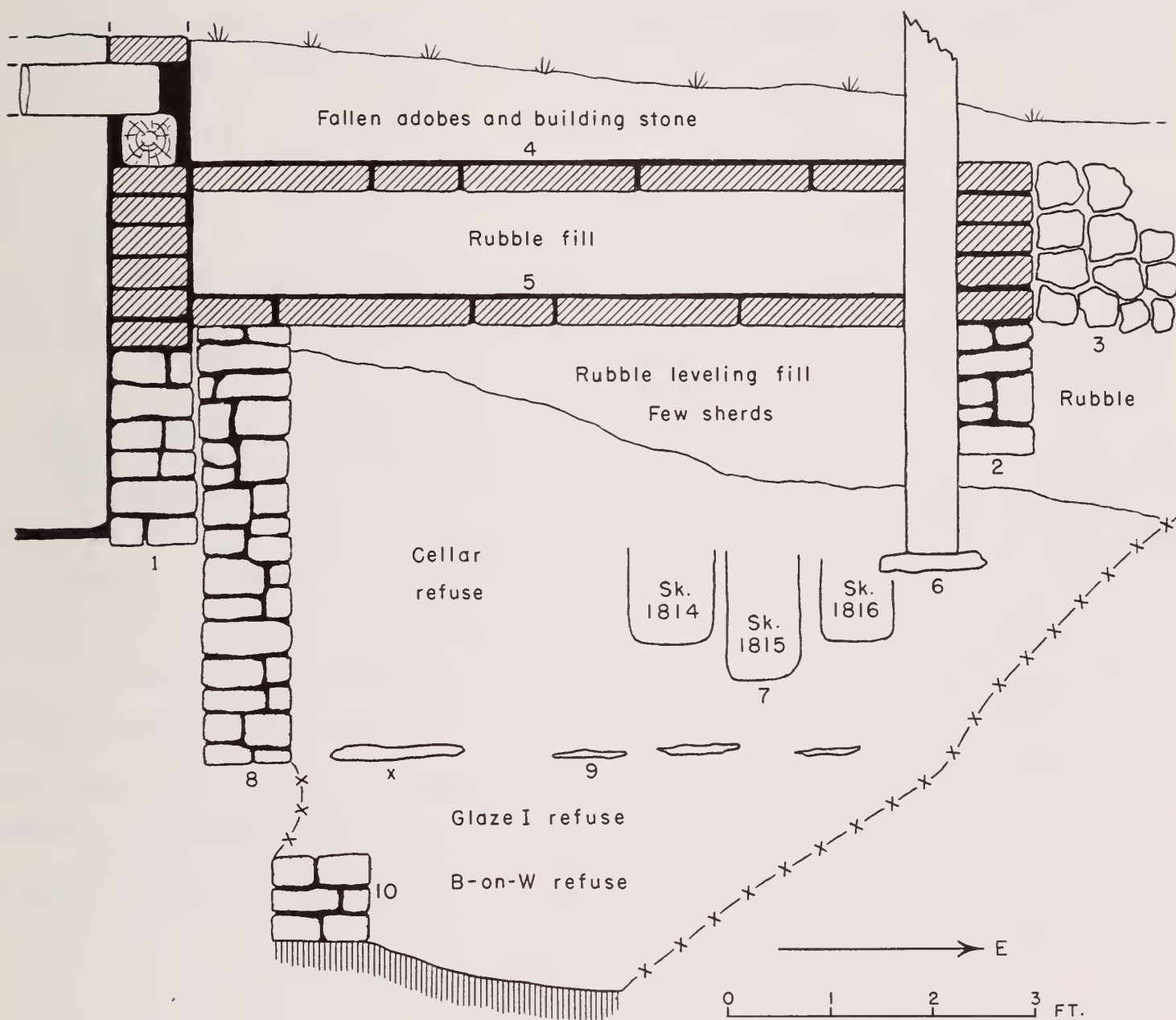


c

Fig. 39. Adobe construction: a, double thickness wall of eastern rooms bordering southwest entryway into plaza. On sides is a heavy coating of adobe mortar finished with multiple thin layers of light green plaster; b, section, looking north, through terrace (Fig. 37b) west of Kiva 14, southwest corner of plaza. Conditions below double terrace indicate long use of area. 1, 2, adobe walls on apparently specially laid stone foundations. Upper part of 1 built on squared timber, which also supported east-west roof beams of room to west, which was only dug to floor. 2, probably did not rise above terrace. 3, piled dry-masonry buttress off edge of terrace. 4, latest surface of terrace. 5, presumable earlier surface; reason for raising terrace not clear. 6, post, probably a gallery support installed when terrace was built. 7, three of six clustered burials of very young infants; actually lay south of section, which was taken at second post in Fig. 37b; no mortuary pottery, but graves postdate deposition of cellar refuse. 8, wall, good masonry, probably Glaze I, kept in service until terrace built. 9, apparent floor level, partially slabbed. 10, stub of evidently stone-robbbed Black-on-white wall. x, Early Biscuit A sherd under slab.



a



b

year Guthe and I located and cleared for a short distance the foundation of what was doubtless the same early wall. It had crossed the North Terrace just south of the later one. Also in 1916, a third piece came to light in the deposit east of Kiva 21 (Fig. 45). Farther to the south, east of the South Pueblo, there seemed to have been but one wall. Sherds and datable burials proved this to have been built during or after Glaze III. Unfortunately, I have almost no data from elsewhere as to the age of either wall, although it is certain that the one through which Kiva I was cut postdated Glaze I.

The term defense wall is really a misnomer, for as such it could have had little or no value. It was so long that it would have been impossible to man it, even in the heyday of Pecos, without a fatally wide deployment of all available fighting men. The real strength of Pecos and other Upper Rio Grande Pueblo IV towns lay, as Castañeda and de Sosa make clear, in the dwellings themselves. But the wall may have been a morale stiffener and perhaps a deterrent to attacks by small groups.

As far as I know, Taos, also on the eastern frontier, was the only other walled pueblo. I remember to have read somewhere that members of potentially hostile tribes, Comanche or perhaps Utes, who came to trade at Taos were kept outside its wall; and Castañeda says that Teyas from the Plains were not allowed to spend the night inside that of Pecos (Winship 1896:524). It and the one at Taos may indeed have served more as fences than as fortifications.

In its whole extent, I could find no break in the Pecos wall except the wide opening on the west side that is described and illustrated by Bandelier (1881:46, 66; Pls. I, D of Fig. V; IX). Its wings were not, I think, so heavily built in order to hold any form of gate, but to resist the rush of water that pours down through it from the extensive open slopes above when Pecos is deluged by summer cloudbursts. There must also have been considerable run-off from melting snow. This drainage supplied, and still fills, a large reservoir in what seems to have been a corral or possibly an irrigated garden patch mentioned by Dominguez (Adams and Chavez 1916:213).

If there were other breaches, they are not obvious. There may have been narrow openings, now choked by stones from their sides, to accommodate the constant comings and goings of so populous a community. Less probably, wooden stiles or short in-and-out, semi-permanent ladders might have served.

Drainage

For as sizable a pueblo as Pecos, with its great expanse of flat roof, the problem of rainfall disposal was no small one, especially when it involved handling the torrential downpours of the summer thunderstorms. We recovered no fired clay spouts like those found at Awatovi (Montgomery, Smith, and Brew 1949, Fig. 30j, k) that might have served to prevent

water falling on house tops from coursing down walls to the detriment of their plaster, but wooden ones such as Mindeleff (1891, Fig. 41) noted at Zufi might have been used. Escape of water from the plaza seems to have been principally through the east entryway, down the center of which we uncovered a narrow channel edged on both sides with slanting slabs. This was not earlier than Glaze III and what was done when Black-on-white houses stood across that space is not known. Nor did we note, although the matter failed to be considered while excavation was in progress, any break in the defense wall at that point. There certainly was none like the already mentioned wide opening with heavy sides that existed where the defense wall crossed the lower part of the extensive slope southwest of the Quadrangle. A certain amount of drainage took place through the northwest and southwest entryways, that from the latter eventually passing through the big west gate.

Ovens

At several places on the North and West Terrace middens, and at one spot near the top of the eastern refuse heap, but not in the plaza of the Quadrangle or on the East Terrace, there came to light remains of conical pits which had repeatedly held very hot fires.

Only one was sufficiently well preserved to permit a drawing (Fig. 33b), but parts of others showed that all were much the same in size and shape. Their flat but not carefully smoothed bottoms were approximately round, and from about 40 to over 50 inches in diameter. Orifices were round. Fragments indicated that some had perhaps as much as 6 inches of "neck." In no case was there evidence of a provision for draft, such as the floor-level flue of Zufi underground cooking pits described by Cushing (1920: 204, Fig. 2).

On the floor of Pecos ovens was a more or less heavy layer of charcoal; wood fires had evidently burned fiercely, baking very hard and turning bright red an inch to two inches of the surrounding earth from the floor upward. Outside the red was black carbonization that faded gradually into the general brown of the midden.

That in most cases the pit had simply been dug into the deposit and not lined in any way was proved by several examples, such as the one illustrated, in which a layer or layers of white ash in the earth into which the oven had been sunk could be seen to run uninterruptedly to the very inside of the wall. In places, presumably where the midden was believed not firm enough to stand until fire had hardened the wall, part or even the whole pit had been lined with adobe.

I believe these ovens were all post-Spanish, as Glaze V or later sherds were found in every one. Furthermore, they had been dug from close to the latest surface. On most contemporary surfaces, out from the pits, was much ash and charcoal with many animal bones, mostly bison but some of deer and horse. As none of these was burned, the

cookery was probably a form of barbecue, the joints being wrapped in some way and deposited when the oven had been thoroughly heated. Its mouth, of course, must then have been tightly sealed, perhaps with a stone slab mudded into place. Only in one case was there associated a slab; it was tipped into a partly broken-down oven.

Of the above-ground dome-shaped ovens used today by both Mexicans and Pueblos, we found no evidence; nor, in all our digging, did we encounter any surely pre-Spanish pit that showed signs of having served for cookery or for the firing of pottery.

HOUSEHOLD ARRANGEMENTS

Number of Rooms

Bandelier (1881, passim) calculated that the Quadrangle with its southerly extensions had contained some 585 rooms, the South Pueblo, 517, a total of 1102. Our excavation of parts of these structures allows us to reach, building by building, somewhat more nearly correct figures, which total 1020 (Table IV), 82 short of Bandelier's figure. However, because we have no reliable data whatever as to how many fourth-story rooms may have existed, we have added none to our count, nor have we included the "700 Pueblo" (left center, Fig. 20). This structure, although surely much less extensive than the Quadrangle or the South Pueblo, was briefly occupied during some of the years we have had in mind in making our estimate. These span a period beginning in Late Glaze IV and extending into Glaze V, i. e. from not long before the coming of Coronado to the colonization by Oñate, say from about 1500 to 1600. I think that in the course of that century Pecos probably reached its greatest size. That it ever became larger during the pre-Revolt days, when smallpox and possibly other introduced diseases took toll of all the Pueblos, is doubtful. Nor do I believe that it did after the reconquest by de Vargas in 1692.

Bandelier's calculations were made on the basis of suppositions, which before excavation were perfectly reasonable. They differ, however, so radically from mine that a detailed comparison would be meaningless. It suffices to say that he included fourth stories almost everywhere, occasionally even five, and that he believed buildings were often stepped up from lower levels (see his Pls. II, V), this error having been due to misinterpretation of masses of building stones and sometimes even the still-intact masonry of parts of walls which had fallen or slid down onto the East Terrace and at some other places. These he quite naturally took to be remains of rooms that had been built there.

Table IV presents reasoned guesses as to the number of rooms of the Quadrangle and the South Pueblo in their heyday. The South Pueblo, as already stated, probably did not attain its final size until after 1540. The figures in which I have greatest confidence bear an asterisk. I place less reliance on my counts of east side rooms north of the east entryway and those both north and south of the plaza. I have not included the tier of very late large enclosures on the west side of the Quadrangle that ran between the southwest and northwest entryways (numbered 44 to 71, Figs. 21, 24). The table also presents my idea, at the time it was prepared, of the approximate number of families and of persons occupying those rooms. This necessitates further description of the room-groups that I call apartments, and discussion of the probable functions of their component rooms.

TABLE IV

	12-ROOM SECTIONS	6-ROOM SECTIONS	NUMBER OF ROOMS	NUMBER OF FAMILIES	NUMBER OF PERSONS
QUADRANGLE					
FROM S. END S. SIDE TO E. ENTRYWAY	18*		216	36	180
FROM E. ENT. ABOUT HALF WAY TO N. END	6		72	12	60
N. HALF E. SIDE TO N. END OF PUEBLO		5	30	5	25
N. END TO NORTHWEST ENTRYWAY		5	30	5	25
W. SIDE TO SOUTHWEST ENTRYWAY		18*	108	18	90
S. EXTENSION FROM SOUTHWEST ENTRYWAY	10		120	20	100
S. SIDE TO SOUTHWEST ENTRYWAY	7		84	14	70
TOTALS, QUADRANGLE	41	28	660	110	550
SOUTH PUEBLO					
ALL EXCEPT LONG ROOMS AT N. & S. ENDS	30*		360	60	300
GRAND TOTALS	71	28	1020	170	850

Apartments

As has been said, the basic unit of the pueblo, from some time in Glaze III onward, was the transverse section which, wherever we excavated, proved to be either three ground-floor rooms wide, as on the west side of the Quadrangle (Figs. 24-27), or six ground-floor rooms wide, certainly in most, seemingly in all, other parts of Pecos (Figs. 21, 35). Each shorter section constituted a single apartment, consisting of six rooms--seven if of four stories. The longer sections contained two identical apartments set back-to-back. These sections, accordingly had twelve rooms--thirteen if one, fourteen if both apartments ran to four stories.

Each apartment had three "cellar" rooms, A, B, C (Fig. 33a), low-studded and usually much reduced in size by the piled "buttressing" of

all four walls (Fig. 28), the two inner ones offering no immediate access to either light or air. From the outer room, A, one could reach the lower gallery, G-II, through a trap door in its roof. None of the A rooms gave evidence of having been lived in. There were no metate bins, no fireplaces. They may at first have served for storage, but those we excavated practically always proved to have become dumps and to be choked, often almost to their low roofs, with household refuse: corn husks and cobs, squash rinds, other unidentifiable rotten organic materials, and always quantities of bones--bones of deer and turkey, sheep, burros, goats, and particularly horses; and of bison, a great many. No fish bones came to light here or elsewhere at Pecos, although trout were abundant in the nearby river and as far as I know, there is no taboo against eating fish at any Pueblo. Parsons (1939:1,000), commenting on my note as to this (Kidder 1932:196) says that the Pima throw fish bones into the river to become fish and wonders if their absence from the Pecos refuse might be due to a similar practice.

The accumulation in these and some other ground-floor chambers we called "cellar refuse" (C.R. in the sectional drawings). It gives one a low opinion of Pecos housekeeping. One hopes the hatchways had tight-fitting odor-proof covers; some A rooms, as a matter of fact, were permanently sealed off (see Room 77-1, Fig. 27). Nevertheless, these once noisome deposits yielded most of the very few specimens of perishable materials that we recovered, badly decayed but mostly recognizable--worn-out baskets, scraps of rush matting, of cotton cloth, and in Room 39 gourd and tortoise shell rattles cached in a jar sunk in the earthen floor (the excavation of this very typical "cellar" and of the graves below it is described in Kidder 1924:29).

The B and C rooms (Fig. 33a) were much like A and seldom could be entered save from above. Many of them also held cellar refuse, but perhaps because living rooms were above, it consisted largely of corn husks and cobs, with few animal bones. The D and F rooms were of course the best lighted and ventilated in any section. Each opened on a gallery. I think there can be no question that these two were the principal living quarters, E rooms serving perhaps for sleeping, perhaps for storage of maize. Incidentally, no floor was crossed by one of the low adobe ridges sloping toward the "foot," that appeared near one end of many rooms at Puyé (Morley 1910:10). In our 1907 field notes, Morley and I, whether or not correctly, called them "sleeping ridges."

To continue speculating about the dwellings, I have topped my ideal half-section (Fig. 33a) with a fourth story, Room X. It seems reasonably certain, in spite of the early accounts, that there was never a continuous tier of such rooms, although I am sure that there were structures of some sort, perhaps lightly built, here and there on the roofs of the third story. One of these, although of adobes and therefore by no means light, was found in the ruins of the west side of the Quadrangle (Fig. 31b). But my principal reason for believing that this lofty area, which in a twelve-room section was two room-roofs wide, must have been put to use, is

that one sees at various modern towns, particularly the Hopi villages and Zúñi, how much of Pueblo life is passed on the housetops.

The real purpose of the blank-walled exterior, A, rooms was of course defensive. Their roofs, all at the same level, made it possible, as Castañeda says, to go freely about the whole village. And it could be done under cover, for the second story street-like way was itself roofed, as was the third story "street" provided by the roofs of the set-back second-story living rooms. All this is made clear by Moorehead's drawing (Fig. 23).

That each apartment constituted the standard space allotment for a group of some sort, I presume of kindred, seems certain. Castañeda, it will be recalled, says: "The houses [i.e., apartments] that open on the plain are right back of those that open on the court, and in time of war they go through those behind them." The assumption that they were dwelling units, perhaps better termed unit-dwellings, is strengthened by the fact that surely in most, possibly in all, parts of the building, there were no intersectional doorways. We found none in the eleven sections we excavated on the west side, the two on the east, or the one each we emptied in the southwest extension (Fig. 36) and the South Pueblo; nor did Corbett encounter any in the ten he cleared in the latter. Another possible indication of group "ownership" of the apartment is provided by the walls, apparently not over 2 feet 6 inches high, that extended 3 - 4 feet outward onto the floor of Gallery 106-G from the main walls of Room 107-2 (Fig. 34) at the north end of the South Pueblo. They were discovered by Guthe when he was studying the already described underpinning of that gallery. How general such constructions were we do not know, because only at that one place was there found intact the rear part of a gallery floor. If these little walls were habitually, or even commonly, built it would seem to show that although the gallery was considered community property, the immediate front of an apartment belonged to its inhabitants.

For surely more than three and probably nearer four centuries the Pecos lived in quarters that differed hardly at all from the original Glaze III plan. In fact, many rooms of the Quadrangle proper were actually built, as far as we could make out, at that remote time and were occupied with no significant change until the end. Later enlargements, such as the B-Series wing, probably the Southeast Annex, and certainly the independent South Pueblo, all conformed closely. The only important post-Glaze III innovation, if such it was, consisted in the addition of the galleries. But although these rendered the pueblo more commodious and livable, they produced no change in room arrangement.

Comparison With Other Upper Rio Grande Pueblos

Pecos' transverse sections and the uniform arrangement of their rooms was a matter of observation. That each short section constituted

a single apartment, each long section a pair of apartments, I believe but cannot prove. That hypothesis leads to questioning whether other contemporary pueblos were similarly planned, a query which cannot at present be answered with conviction. We know too little, really surprisingly little considering the amount of archaeological investigation that has been done in the area, about the gross makeup, to say nothing of the architectural details, of most upper Rio Grande pueblos of the general period of the crystalization, so to speak, of Pecos during Glaze III.

In our search for pertinent data it is, I think, safe to disregard Unshagi, the only Jemez pueblo of which we possess an adequate ground plan (Reiter 1938, Fig. 4) because it differs so markedly from Pecos, both architecturally and ceramically. The pottery of the other contemporaneous Jemez ruins is also apparently similar to that of Unshagi, so that we should presumably consider it and them to have been of a culture too unlike that of Pecos to be of value for the present inquiry. But to the west and southwest, and nearest to Pecos of any important ruins of the period in question are those of the Galisteo Basin. At San Cristobal, one of the largest, N. C. Nelson (1914, 1916) located the midden in which he made his pioneer stratigraphic excavations. He also thoroughly explored the Basin and adjoining country, mapped many sites, and made a number of test diggings. He had planned a campaign of intensive excavation in that region, together with study of its minor antiquities. But most unfortunately, and a real calamity for all concerned with Rio Grande prehistory, other field and museum duties prevented further Southwestern research and publication.

Nelson having been unable to do more than partially clear any one of the Galisteo ruins, we lack precise data on their makeup. It is nevertheless obvious from his surveys of the mounds that the pueblos chronologically equivalent to Pecos from Glaze III onward were mostly extensive, rather rambling, and as a rule partly or wholly surrounded courts. None of the Galisteo towns occupied a really strong position and most of them were very poorly situated for defense. That they were, like Pecos, made up of transverse sections seems evident from the ground plan of the historic portion of San Cristobal (Nelson 1914, Plan I).

Not strictly one of the Galisteo ruins, but evidently closely akin to them and situated not far to the west, is Paa-ko, whose architecture and artifacts have been most satisfactorily studied and recorded by Marjorie Lambert (1954). That pueblo was not continuously inhabited; its first occupation she determined to have lasted from the late 1200's to about 1425, in ceramic terms from the Santa Fe-Galisteo Black-on-white phase well into, but not beyond, Glaze I. This corresponds very closely to the life of Forked Lightning, plus the later years of Loma Lothrop and the Arrowhead Ruin. Following an interval of abandonment, Paa-ko was again settled some time after 1525 and finally deserted about 1670, i. e., from near middle to late Glaze IV through Glaze VI; Modern ware was just beginning to appear (*idem*: 174-180).

The excavated part of Paa-ko's prehistoric pueblo (*idem*: Fig. 2, B),

almost completely of coursed adobe, bears rather strong resemblance to Forked Lightning (Fig. 2, above). The historic part is stone walled (Lambert's Fig. 2, C) and is definitely made up of transverse sections, mostly 6 ground-floor rooms wide, but evidently, because of the presence of firepits in some of the interior rooms, the Paa-ko sections were not always as many storied as were those of Pecos.

Northwest of the Galisteo Basin and across the Rio Grande is the Pajarito Plateau, a great tufa tableland dissected by many steep-walled cañons. Of its numerous ruins, some small ones date from Black-on-white times, others from that phase through Glaze IV, a few were still occupied in 1540, but were not visited by Coronado. The large Pajarito pueblos differ ceramically from those of the Galisteo and Pecos, in that they contain a high percentage of locally made Biscuit, a ware found at Pecos, but obtained in trade. They conform more or less closely to what might be called the late Upper Rio Grande standard. Of these, Puyé is four-sided, surrounding a court. Hewett (1909b: 20, 21) supplies a general plan, but Morley's admirable (1910) paper on its South House is the only accurate and detailed description of it or any other Pajaritan pueblo. His plan shows that in this structure there were 14 transverse sections 8-12 rooms wide. No kiva was dug, but Hewett states that one had been sunk into the tufa bedrock. This seems to have been done at several pueblos built on mesa tops with little soil. Also surrounding a court is Tyuonyi in the Rito de los Frijoles, almost circular, with sections mostly of 4-7 rooms. It had an entrance passage at the east. Three kivas are in its court, of which one was excavated; a Great Kiva lies outside to the east. K. M. Chapman's fine drawings of both are in a paper by Hewett (1909); Hendron (1940) provides a detailed description of the large kiva. Most interesting are the chambers cut into Frijoles Canyon's sheer north wall of soft tufa. Many of these were the lower, some the second-story rear rooms of long pueblos backed against the vertical cliff. Their masonry walls had fallen, but Chapman, who mapped the assemblages and made clear restored drawings, was able to determine, from holes cut in the cliff for the butts of roof beams, that they had often been three stories high (Hewett 1909: Figs. 84, 85). The arrangement of their six free-standing rooms had been exactly like that of the sections on the west side of the Pecos Quadrangle (Fig. 33a), except that some had had the just-mentioned extra room cut into the cliff. Tschirege, another great Pajaritan ruin, is on three sides of a court. Chapman's restored drawing (Hewett 1904a: Fig. 1) shows the pueblo proper and terraced structures with tufa-cut rooms like those at Tyuonyi built against the wall of the low mesa on which the main ruin stands. The ground plan of the latter (Hewett 1906: Fig. 10) shows clearly enough that it was made up of transverse sections. The same is true of Otowi, a large pueblo of 5 long buildings (*idem*: Fig. 6) and of several others on the Pajarito.

To the north, in the drainage of the Chama are other great ruins. One of the largest and most interesting is Chipiinuinge, which occupies a strongly fortified site on a high, steep-sided mesa with excavated

rooms in the tufa cliff below it (*idem*: Fig. 20). Mera, in his valuable "Survey of the Biscuit Ware Area" (1934: No. 30 on Map I), considers it to be a Glaze I-Biscuit A site. If so, it is too early to group with the pueblos we have been considering, and Hewett's plan, not being based on excavation, cannot be taken surely to indicate a sectional arrangement. Also on the left bank of the Chama, below Abiquiu, is Po-shu-ouinge, a very large adobe ruin, whose long narrow buildings enclose two great courts (Jeançon 1923). It is a Biscuit B pueblo that was occupied into Glaze IV times, but was abandoned before 1600, perhaps before 1540. The inconsiderable width of the component structures is due to the majority of their scores of sections being but 3 rooms wide, only a few of 4. Jeançon presents good evidence (*idem*: 5, 6, Fig. 2) that some at least of the buildings were three stories high, but the arrangement of the constituent rooms is not clear.

Still further down on the Chama's left bank is Te'ewi, another adobe ruin enclosing two courts. The limited excavations in this pueblo, which dates back to Black-on-white times, but was not abandoned before Biscuit B came into use, are fully described and illustrated by Wendorf (1953). A more substantial building than the last, most of its sections were six ground floor rooms wide.

Well north of the Chama on its tributary, the Rio Ojo Caliente are very large adobe pueblos, Houiri, Homayo, Posege. Described by the indefatigable Bandelier and mentioned by Hewett and others, they have never been excavated, nor have adequate ground plans been published.

This completes the hasty listing of the large Upper Rio Grande Pueblo IV and V towns about which most is known. That is little enough, but had we studies of a carefully selected series of them, equal in quality and completeness to that of Morley on Puyé, Lambert on Paa'ko, Wendorf on Te'ewi, and Reiter on Unshagi, we would certainly be able to reach really valid conclusions as to the late architecture of the region; and could we add knowledge of the artifacts other than pottery, of which we have a considerably closer acquaintance, it should be possible to produce a treatise on local cultural trends and interinfluences, their effects and perhaps even their causes, that would be of value for understanding not only the history of this province, but also for throwing light on many far-reaching archaeological problems.

The reading necessary for the foregoing survey has made clear: a, That no site of the age and type of those just discussed can be supposed to have held so long and so strictly, as did Pecos, to sections uniform in room arrangement, or to ones which invariably possessed either 3 or 6 ground-floor rooms; B, (I have capitalized this because I am sure it is so important) That every archaeologist should be thoroughly grounded in what is now known as "Social Anthropology," but which, during my academic years, had not worked itself out of the more purely descriptive disciplines, Ethnology and Ethnography. Had I been associated, during the Pecos project, as I later had the good fortune to be in Yucatan and Guatemala, with Robert Redfield and Sol Tax, I am sure that with their

aid I could have formulated numerous problems toward the solution of which the shovel might have aided.

Adaptation to Glaze III Structure

As has been shown, the Quadrangle was built during Glaze III, in the course of the fifteenth century. It was preceded by a succession of straggling one- and two-story pueblos, to all of which rooms could evidently be added at will. Old quarters did not necessarily have to be kept in repair, but often were abandoned, filled with rubbish, and replaced by new rooms. The Quadrangle, on the other hand, its annexes, and the South Pueblo were structures of a very different sort, new to the Valley. Whether this was a local development or was copied from other contemporary or earlier Rio Grande pueblos is not yet known. Obviously, it was designed for protection from attack. The defensive element in Southwestern town planning, in architecture, and in the siting of dwelling places has never been made the subject of special study. There can be no question as to the great historical and social significance which such a research would have--clearer understanding of settlement patterns, of relations between sedentary agriculturists and hunting-gathering peoples, between groups of agriculturists.

Lacking an adequate range of descriptive and comparative data on this subject one can only say that in the San Juan drainage a need for defense appears to me first to be shown by the great twelfth century pueblos of Chaco Canyon, which lacked, or had very few doorways opening through exterior walls. I realize, of course, that leading authorities have doubted that desire for security caused those Chaco structures to be planned as they were. That problem could probably be settled by the study just suggested. There cannot, however, be much question as to what led the people of the Mesa Verde to begin, a century or so later, to build more and more often in caves to which access was difficult. On the Mesa Verde and to the north in the McElmo-Yellowjacket country of southeastern Utah, the earlier settlements had not been located with an eye to defense (Prudden 1914, 1918; Kidder 1910; Brew 1946). The later pueblos of full Mesa Verde culture in the latter region faced on the sheer edge of deeply-cut canyon heads, presenting blank walls to hostile attack from the rear (Morley 1910; Morley and Kidder 1917).

Against whom precautions were taken in Chaco Canyon, the Mesa Verde, and elsewhere by the San Juan Anasazi is a matter of conjecture. Danger might have come from nonagricultural marauders, or from other Pueblo Indians. At any rate, the San Juan drainage was abandoned. For that, the severe and prolonged drought of 1276-1299 is usually held responsible. Undoubtedly, it should be blamed, probably in major degree. Aside from crop failures and the drying up of springs, lack of rain might well also have led to both intervillage strife and to attack by nomads. But had savage enemies not played a great part in bringing about the evacua-

tion of the San Juan, the Anasazi, I feel, would have returned to their ancestral lands or might even have hung on here and there until conditions bettered. The Hopi have shown how successfully Pueblos can support themselves under most adverse circumstances.

Nevertheless, the northern Anasazi failed. Their number was presumably reduced. We still know little of just what became of the survivors, but it is clear that they strongly augmented the population of the Little Colorado and the Rio Grande. It is also, I think, to be inferred that their coming stimulated the heightening of the southern cultures, which took place at about the time the San Juan refugees were moving in.

Nothing dependable can, I fear, be learned as to the happenings of those days from any of the living Pueblos, who are notably lacking in historical interest. Lowie did not exaggerate in expressing utter disbelief in anything told him by the Hopi, even regarding more recent events. I reached the same opinion after checking, on the basis of known pottery sequences, the ages relative to each other of various ruins about the First and Second Mesas, for I found that information given Fewkes by Hopi informants as to these sites was in most instances completely wrong. The same is true of what Bandelier and Hewett were told at the Rio Grande towns. For example, the Jemez, says Hewett, have "well preserved legends" that the pueblo at Rowe was the last to be abandoned of the minor Upper Pecos Valley towns, although both Loma Lothrop and Arrowhead were occupied much longer. Hence, one can rely only on archaeological and linguistic evidence for knowledge of Pueblo prehistory. Pottery and the defensive or non-defensive nature of dwelling sites enabled Mera (1934, 1935) to add greatly to understanding of events in the Upper Rio Grande. One of his most interesting and I believe accurate conclusions was that hostile pressure was early and strongly exerted from the northwest upon towns toward the head of the Chama. This certainly began before the opening of the Glaze III phase and knowledge of what was happening there might have helped induce the Pecos more willingly to accept the undoubted hardships involved in erecting the Glaze III Quadrangle. On the other hand, I have no doubt that attacks from the east, which, it will be remembered, probably led to the abandonment of Forked Lightning and to the fires at Pecos, were the principal cause of the new architectural development.

That certainly did bring hardships--the giving up of old homes, and the heavy labor entailed by the building of a single multistoried structure large enough to house the entire community. Another tribulation, although perhaps somewhat less burdensome to a group of Pueblos than similar restrictions and duties would be to us, was the extraordinary standardization of living quarters. This was the result of the new pueblo's rigid sectional layout, each apartment being like every other in the number and the position of its rooms. There was left little or no initiative for anyone in the matter of housing, and what was probably often a Procrustean fitting of a growing family into a limited space was undoubtedly a trial. Furthermore, when Pecos was in its prime, the householder must, for

the good of all, have been held strictly responsible for the proper upkeep of his apartment lest leakage threaten his neighbors' foundations.

The acceptance of all this implies a remarkable willingness to abide by the decisions of leaders, for there can be no doubt that in one way or another the new type of pueblo was "masterminded." The individual can seldom have taken much part in the first planning or later in the administration of the quarters which, depending on whether a patrilocal or a matrilocal system obtained, were to be occupied by him and his or her and hers. This raises two important questions, neither of which, unfortunately, can be answered with any degree of assurance. The first concerns what official or what body made decisions as to this and other secular matters; the second regards their enforcement. Such problems lead to appraisal of the nature of our knowledge of the Pueblos, past and present.

These remarkable people have retained to a greater extent than any other Indians of the United States--or for that matter any equally advanced New World agriculturists--their aboriginal way of life. That, of course, is why they have so intensively been studied. But the investigations of recent decades have dealt primarily with the kinship systems, the socio-religious organizations, and the ceremonies of the several Pueblo groups. This is natural enough, because of the intrinsic interest, the intriguing variety as between different communities, and the importance of these matters for anthropological theory. On the other hand, very little information has been gathered that bears on the questions just asked or as to many other practical customs and lay practices.

At this point I had written two or three ill-natured pages, since deservedly wastebasketed--a letting off of steam caused by the intimation by my long-time and greatly admired friend, Elsie Clews Parsons (1939: lxiii) that a needed linkage between past and present could be attained, "once Southwestern archaeologists acquire an interest in relating contemporary and prehistoric culture." I had peevishly, but I think with some reason, complained that the most effective linkage between archaeology and ethnology is in the field of material culture and I had asked if any recent Southwestern ethnologist save Florence Ellis had devoted anything like adequate attention to pots, pans, or milling outfits. However, on rereading those pages I decided that people who lived in ceramic houses, as did I so nearly exclusively at Pecos, had no business to be throwing stones, even manos.

It is a pity, though, that since Cushing, the Mindeleffs, and Hough so little heed has been paid to Pueblo arts and crafts, cookery, domestic arrangements, or house-building. Southwestern archaeologists, also, have been by no means blameless. Most of us have immersed ourselves in taxonomy, pottery classification, artifact typology, detailed description of structures, all essential activities but not ends in themselves. We have it is true, been dealing with people long since dead. But we have made small effort to bring them back to life, our principal interest in the Pueblos as individuals having been in the shape of their skulls and, as social beings, in their mortuary practices.

To get back on the track, it seems probable that the Pueblos from ancient times on have not strongly insisted on maintaining personal "rights" and so have been willing to abide by the decisions of leaders. Life as closely communal as theirs could hardly otherwise have persisted relatively unchanged for so many centuries. And in the case of Pecos the increasing menace of savage foes, as the towns to the east were destroyed or abandoned, must have borne in upon them the necessity of a solidarity that could only be achieved by obedience to authority. And until the United States Army finally removed all danger from Comanche, Apache, and Navajo, this menace persisted.

Another interesting angle is suggested by Wittfogel and Goldfrank (1943): "When in pre-industrial civilizations, water control demands large-scale cooperation, tribal, regional, or national directing centers of authority arise and cooperative action as well as communal discipline are institutionalized." In my opinion, irrigation as a force for strengthening official authority could not have played a major role in the Southwest, except perhaps among the Hohokam of the Gila-Salt. Incidentally, its importance in Mesoamerica has, I think, been recently much overstressed.

How extensively the Pecos irrigated is not known, but it certainly was practiced to some extent. There is land in the upper valley onto which water could have been brought from the Pecos river; also there is a little below Glorieta and southeast of Pecos along the Arroyo del Pueblo, which the early accounts all speak of as a running stream and which old Señor Roybal told me never used to go dry. Bearing on enemy trouble as well as on irrigation, he also said he'd heard from his father that on one occasion a gang of Pecos men working on a ditch west of the present Mexican town were "jumped" by Comanche and all killed.

Most potent of all for the regulation of Pueblo society, however, was the pressure of public opinion. As Titiev (1944:65) says, "individual freedom of behavior is checked by a fear of non-conformity.....So marked is the dread of running afoul of public opinion among the Hopi, living as they do in closely grouped communities, where privacy is out of the question, that only a man of exceptional character dares to depart from conventional modes of behavior in any important respects." Parsons (1939:67) also mentions, as deterrents to going counter to established custom, Pueblo "fear of ridicule, fear of public opinion."

There can be no question that in its prehistoric heyday, and for long after the Conquest, Pecos was a well-run community. Its size and evident prosperity could not otherwise have been attained on the exposed eastern frontier of the Pueblo world. Nevertheless, in the early 1600's, the Spanish forced on Pecos and on each of the other Pueblos save the Hopi, a so-called governor, in order that there should be an official with whom they could deal. This of course does not mean that the Pueblos of the contact period had lacked responsible heads, but the function of those leaders, in the eastern towns usually called caciques by the Spanish, was perhaps not grasped or, if understood, may well have been willfully ig-

nored. That office differed somewhat from group to group in the manner of its holder's appointment and in its duties. But where it existed, it was definitely the most important religious position. Even if the Spanish had realized that among the Pueblos church and state were one, and that the cacique was therefore actually the supreme head, they would not have wanted to have any traffic with the Devil's principal representative.

As a matter of fact, the typical cacique was undoubtedly a hard-shelled conservative and a hater of those who were so obviously setting out to destroy the native cult. Beside which, the cacique had to work for the welfare of his people by prayer and often by prolonged ceremonial retreats which must not be interrupted. He was thus a most unsatisfactory sort of official to do business with. Hence the installation of the elective governors.

We do not know how the governorship worked out at Pecos. Hawley (1937) makes it clear, however, that today the election "is generally a farce, that appointment stems from the religious organization, and that although the governor deals with outsiders, he is in reality little more than an executive arm of the religious group."

All of which shows that in spite of their three-and-a-half centuries of effort the Spanish have been unable to bring about effective socio-religious acculturation even of the towns most exposed to their efforts. Eggan (1950:319) emphasizes, indeed, "the discipline and centralization that all observers of the eastern Pueblos have noted." I think it safe, therefore, to believe that the people of Pecos who were not only easterners but also long liable to hostile attack, were perhaps more ready than those of most other towns not to press individual claims. This naturally does not answer my earlier query as to who made and who enforced decisions as to such matters as housing, but it makes it easier to understand how so inelastic a system of living quarters could not only have originally been accepted but have remained so long in force.

We know pitifully little as to the social organization of Pecos, either at the time of the conquest or later. A capitan came with other Pecos Indians to Cibola to report and bring gifts of buffalo hide to Coronado soon after his arrival there in 1540. Dubbed "Bigotes" because of his long moustache, he was a fine-looking young man, perhaps the War Chief. Another official, later carried away from Pecos along with Bigotes, the two being held for some time by Coronado, is referred to by Castañeda as the gobernador. Nothing beyond that title describes his function, but as he was said to be an old man, I suspect he was the current cacique. Both he and Bigotes were evidently very important persons, for the Pecos were much distressed by their abduction and correspondingly pleased when they were repatriated before Coronado set forth on his futile journey to Quivira. The office of this gobernador was of course not that of the governors appointed by order of Otermin when he colonized New Mexico a half-century later.

Population

To consider the question of population raised by the counts set forth in Table IV, my estimate of approximately 850 souls for the whole town, except the relatively small "700 pueblo," must, from all the Spanish accounts, be far too low, particularly in view of the fact that my allowance of five persons per family may have been somewhat too large. This was made clear to me by Miss Eleanor Adams of the University of New Mexico. Her studies with F. V. Scholes and most recently with Fray Angelico Chavez in editing Fray Francisco Atanasio Dominguez' great work on the Missions of New Mexico in 1776 (Adams and Chavez 1956), have led her to give much attention to problems of Pueblo population.

She has very kindly copied for me two detailed censuses of Pecos of 1750 and 1790, excerpts from which, with her permission and that of Dr. Scholes I have presented in Appendix II.

Dominguez, evidently a careful and conscientious recorder, lists the number of families and number of souls in all the Pueblos save the Hopi towns. The "family" of Dominguez presumably consisted of father, mother, and children, together with such immediate relatives as lived permanently with them (see Pecos census of 1790, Appendix II). His data, probably obtained from the resident priests, show an average family of about 3.7. At Tesuque (45 families and 194 inhabitants) it was largest, 4.31; at Santa Clara (67 and 229) it was smallest, 3.4. Zúñi, the most populous Pueblo (396 and 1,617), had a family of slightly over 4.

The Pecos family (100 and 269) of only 2.69, I did not include in making the above 3.7 average, as Dominguez shows that the town was in a very bad way because of persistent Comanche raids. It had also recently undergone a devastating epidemic of smallpox. The other two frontier towns of the period--Taos (112 and 427), family 3.81, and Picuris (64 and 223), family 3.48--had evidently suffered less severely from nomadic attacks.

I think it most unlikely that the "700 pueblo" consisted of more than 12 sections, in other words 24 apartments. If occupied by one five-member family each, these would only raise the Pecos population by 120 individuals, or a total of 970. All this, of course, throws doubt on my original idea that each apartment housed only a single family of husband, wife, and children. That I also may have been wrong in using a factor of five, was first called to my attention by Miss Adams, who on November 26, 1956 wrote me: "When I received your inquiry about the size of the normal Pueblo Indian family, the number four was the first that came into my head, and after going over a number of documents and censuses, I am inclined to stick to it as the most likely factor for determining population. Dr. Scholes also thinks this is as high as we can go, and is inclined to favor four minus rather than four plus--this not only for New Mexico, but for Mexico proper and for Yucatan. Detailed censuses always show that the average Indian family was much smaller than the average Spanish family--in fact the figures are quite striking. We both

feel that the 4.5 factor we used in Acalan-Tixchel definitely erred on the generous side."

It must be remembered, however, that all our figures as to the size of the Pueblo family are from the years after the Revolt, and it is not improbable that for almost a century before 1680 diseases introduced by the Spanish may have taken a toll great enough to have reduced the family from a pre-1600 average not far from 5. This was pointed out to me by Dr. Kluckhohn, who believes the present-day Pueblo family probably approaches the order of 5. He has also given me some pertinent notes gathered for him by R. B. Woodbury when a graduate student. From these I have drawn the following figures. Kroeber's (1917) estimates: six Hopi towns, 4.7; Cochiti, 4.6; Zúñi, 7.5. Estimates derived by Woodbury from Parsons' reports on San Juan, Santa Clara, San Ildefonso, Tesuque, Nambé, and Jemez yield an overall average of 5.0; Nambé being the highest, with 7.1. Parsons (1925, p. 47) states that at Jemez, "school and house censuses show an average of but four or five persons to the household" (*italics mine*).

Even the first of the above-mentioned interesting censuses--450 in 1750, 154 in 1790--was made when the population of Pecos had shrunk to such an extent that no light is thrown on the problem of the number of people who occupied an apartment when the town was in its prime. Nor does either suggest what, if any, relationship may have existed among them.

The approaching end of Pecos may well be reflected in the very small family size of those days that is shown in Dominguez' report. The falling off was doubtless to some extent due to individuals and perhaps whole families drifting away to settle elsewhere. We know that both Cochiti and Santo Domingo received people from Pecos before the move to Jemez of the few survivors in 1838. Such leakage, I imagine, had been going on for some time. But a lessening birth rate may have been a not unimportant factor in accelerating the decline. This seems to have occurred at Pueblos threatened with extinction, for Juan Gonzalez, then Governor of San Ildefonso, told me in 1907 or 1908 that he was worried about his town. He said nothing of the internal feud that was going on there (one was likewise raging in Santa Clara), but he spoke of the encroachments of Mexicans, and then, referring to Pojaque, extinct since about 1900, he said, "No more people [*i.e.*, Indians] there, women stopped having babies. Maybe our women, too." This, of course, was before what might be called the renaissance of San Ildefonso, that town having been brought back on its feet by the extraordinary financial success of Maria Martinez as a potter, who was followed by other women. I have no vital statistics, but I'd wager that the birth rate has risen.

To return to the matter of housing, it seems clear that I erred badly in assigning to a single family, even of five persons, a whole apartment of six or sometimes seven rooms. Our excavations and testing were thorough enough to show that we did not miss any sizable post-Glaze III building. Thus, I am confident that sixteenth century Pecos simply could

not have contained enough apartments, if each held but one family, to have accommodated a population that one must suppose to have numbered little less than 2,000.

Had Pecos even approached that size, we would have to conclude that each of its nearly 200 apartments (170, Table IV, plus 24 allowed for the "700 Pueblo") accommodated on the average 10 or more persons. Therefore, if my apartment or dwelling unit theory is correct, the normal occupants of the 6 or 7 rooms of a standard apartment must have constituted a larger group, certainly much larger than the 3.7 family of Dominguez' time. It is probable, as has just been said, that prior to 1600 the "biological" family was more numerous than that, but it can hardly be believed that it could have been anything like 10. And even if it had, there simply were not enough quarters to have taken care of such families. So I feel quite sure that the Pecos apartments held aggregates of the sort that Eggan (1950:29) aptly terms households. Of the Hopi household, for example, he says, "The basic family unit is an extended family based on matrilineal descent and matrilineal residence and thus may consist of a woman and her husband, married daughters and their husbands, unmarried sons, and children of the daughters. This group normally occupies a set of adjoining rooms which it uses in common. . . . " If the social organization of the Pecos had been the same as that of the Hopi, my apartments would have been comfortably, perhaps sometimes even uncomfortably, filled.

Unfortunately, we know nothing of the social setup of Pecos and little enough regarding the housing arrangements of most of its "eastern" or Tanoan congeners. But unlike the "western" towns--Zuñi, the Hopi, and the Keresan villages--they were, with the exception of Jemez, patrilineal. They may once have been as strongly patrilineal as the Hopi are the opposite. However, Spanish and, later, American lay influence, together with that of the Catholic Church, have resulted in emphasis becoming more and more restricted to the father-mother-children family, rather than to the household. But I think that in earlier and socially purer days a patrilineal household may have flourished and, in a pueblo as architecturally strait-jacketed as Pecos, may longer have survived.

Having got the Pecos into household groups, and the groups into apartments, the next step should of course be to picture them there. But the history of Pecos was such as to render it the worst possible place to yield information regarding the way of life of its inhabitants. It was, indeed, as deficient in this respect as it was outstandingly favorable because of its vast middens for the study of stratigraphy and the succession of ceramic phases. The trouble with Pecos was that until toward the end it had seldom been in acutely serious trouble. Even during the Pueblo Revolt of 1680, or the following decade of inter-Pueblo strife, or when de Vargas reconquered New Mexico, the town remained unharmed. Archaeologists, buzzard-like, batten on the results of rapine and slaughter. As a single example, one has only to read of Alalakh in Leonard Wooley's "A Forgotten Kingdom" to realize how much the wreckage left by a long

series of calamities can reveal as to the life, the arts, and the religion of a community through the ages. The ferocious sackings, destructions, and massacres so frequent throughout the history of the Old World, seem seldom to have taken place in the New. But in Room 30, wrecked and filled with rock by a falling wall while the town was still occupied, we made a rich haul of ceremonial objects and pottery (Kidder 1924: 26). This showed us how much a general holocaust would have provided. So in spite of my affection for the Pecos, I sometimes used to wish that their town might at some time or other have suffered more disastrously than it seemingly ever did. There had been a fire, as noted, at Forked Lightning and at least two at Pecos. They apparently failed, however, to cause even temporary desertion and everything of value that was not burned had been salvaged. And although the early buildings on the mesilla were one after another abandoned, the thrifty Pecos had removed all usables, even most wall-stones. Likewise during the years of the town's decline, quarters that went out of use were no doubt stripped. When, in 1838, the few Pecos who then remained finally moved to Jemez, they presumably left little of value in their already semi-ruinous houses. What may have remained was, of course, carried away by the local Mexicans. The rooms held for us the scantiest of gleanings. Accordingly we have very little knowledge of household equipment. In addition, we are entirely ignorant of the details of domestic arrangements, for the upper rooms, the galleries, and the housetops, in and on which the Pecos really lived, had fallen into ruin so complete that neither in the late rooms of the Quadrangle or anywhere in the South Pueblo did we find in situ a single firepit or a mealing outfit. Nor did what remained of second- and in places third-story walls tell us much beyond the fact that unlike most bare "cellar" walls they had been sized with brown adobe finished with paper-thin coats, often many, of lime plaster.

Firepits

Firepits came to light in Black-on-white structures on the North Terrace; others of that phase and of Glaze I were deeply buried under Glaze III rooms in the Quadrangle. Some of Glazes I and II were in rooms on the West Terrace. The firepits at Forked Lightning, it will be remembered, were round or oval. Only in a few Black-on-white rooms, however, among the just-mentioned early rooms at Pecos, did pits of the Forked Lightning type occur. In the others, the pits tended to become rectangular, coped with adobe, and with rounded corners. Later they were both floored and edged with slabs; this of course resulted in square corners. Throughout, they were some 20-24 inches long by about 12 wide, inside measurements.

Firepits were undoubtedly present in most, if not all, living rooms of the Quadrangle and South Pueblo that did not have other rooms above them. We found the fallen remains of a great many--heat-reddened sand-

stone slabs, bits of adobe linings and rims burned brick-hard, and ashes. In several cases, on the walls of what had been upper stories, the plaster slightly above the level of the fallen floor was burned and blackened, showing that the firepit had usually been set against a side or the rear of the room. Clay pot-supports (Kidder 1932:144), relatively common at Forked Lightning, also occurred, but less frequently, at Pecos; none is catalogued from a late room. There were no stone firedogs of igneous rock such as were set in the firepits at Puyé (Morley 1910:10, Pls. III, IV).

There is no evidence that at Pecos there were chimneys in prehistoric times. However, Reiter's map of the Jemez Pueblo of Unshagi (1938, Fig. 4) indicates belief that firepits existed in ground-floor C-class rooms, which had one and sometimes two stories above them. No sign of chimneys appeared. Prehistoric chimneys of masonry, not as yet described, were found at the Hopi ruin of Awatovi in rooms in which coal was burned (Montgomery, Smith and Brew 1949:142, note 67). In the wreckage of a number of Pecos rooms that had been occupied in post-Spanish times there came to light, usually in lots of three or four, cooking pots with their bottoms knocked out and heavily sooted within. These had evidently been set one above another to form chimneys (such pots illustrated in Kidder and Shepard 1936, Figs. 273, 276). From their position in the debris, it was certain that they had been on the roofs of rooms like those at Zuñi illustrated by Mindeleff (1891, Fig. 74; and our Fig. 37e). We found nothing to suggest that there had been room-corner fireplaces with interior chimneys, such as are built by the local Mexicans today, nor hood-fireplaces of Zuñi style (*idem*, Figs. 61-70), either of which could have served to carry smoke up through a room to a piled-pot chimney on the roof. It therefore seems that at Pecos a mere hole in the ceiling probably sufficed. The extra height of the pot chimney may have produced a better draft.

Maize Grinding

Bins, in which were fixed sets of three metates, were noted with interest by Castañeda in 1540 (Winship 1896:222). He tells how the metates, graded from coarse to fine, were worked by teams of women. This he first saw at the Zuñi villages. His accurate description and its tone of admiration imply that the Pueblo type of milling was new to him and therefore presumably was not practiced in Central Mexico. I shall return to this point below. Dominguez, speaking of the Tewa Pueblo of Tesuque in 1776, says: "The kitchen....contains several metates (three or four) fixed to the floor with mud (these are generally found after this fashion in the houses of both Indians and settlers), all boxed in with boards, and divided one from another by another small board set cross-wise so that the wheat, maize, or other things being ground by hand may not spill, nor may the contents of one metate get mixed with those of an-

other." (Adams and Chavez 1956: 50). A clear modern description of metate bins and their use at Zufi is by Mindeleff (1891:28). A description of those at the Hopi towns is given by Owens (1893:163, n).

To come nearer home, Reagan (1917:35, 37) provides an excellent account of the handling of maize at Jemez, where he was stationed in 1899 and 1900. The ears were husked, he says, and piled on the roofs to dry before being stored in bins in the houses. Formerly, he was told, a seventh of the crop was held over from year to year to provide for an always possible scarcity. The shelled grain, in his day, was first parched, then ground on sets of three metates of vesicular lava, fixed side by side in a frame measuring 10 feet by 3.

Florence Ellis has kindly given me much information as to present-day milling. At Zia, she writes me, there are used sets of three metates of different grades of fineness, the bin placed not far from the wall. The women kneel behind them, facing outward, and she noticed little niches cut in the wall to accommodate their feet. One or more manos go with each metate. The bins, she was told, are commonly removed in the summer and the metates and manos collected outside, or sometimes plastered onto a little bench outside the house.

Dr. Ellis noted that metates and manos of all sorts, many of ancient types, are to be seen today at Zia. This is due to the fact that the Zia seem no longer to know how to make these implements and gather them, whenever they can find them, from ruins. "It is customary for a woman to give her daughters a set of three metates if she can get hold of them. These may be left at the mother's house if the girls do not actively engage in grinding at present. Obviously this induces collections of metates as the pueblo grows."

A Santa Ana informant told her that sets of metates in bins were in use there until 1910 or 1915. Some families, the informant said, have buried theirs and some still have them tucked away in storerooms. He also said that the women were accustomed to grind and sing to its rhythm about four in the morning and that he used to like to get up early to hear them. (The Zia and Santa Ana data is from letters; Feb. 22, Mar. 12, July 9, 1956.)

In view of the foregoing, it is evident that metates mounted in bins are still in use at some, at least of the eastern Pueblos, although commercial milling has about supplanted the older method. Nevertheless, I suspect that meal for ritual purposes may long continue to be ground on the metate. But what puzzled me years ago, and still does, is why metate bins are so very rarely found in the ruins of the Upper Rio Grande.

At Pecos, as far as the Quadrangle and South Pueblo are concerned, this is readily explainable because only their dark ground-floor rooms were preserved and this work would naturally not have been done in them. But on the North and West Terraces of Pecos, also at Forked Lightning and other ruins less extensively examined, we cleared scores of Black-on-white and Glaze I and II ground-floor rooms that were not dark because, as shown by firepits, nothing had been built over them. In none of these did mounted metates or provision for them come to light.

Excavators of other Upper Rio Grande sites have had the same experience. Stubbs and Stallings found none at Pindi and state (1953:15) that to the best of their belief the same lack obtains in all ruins of the area contemporary with Pindi. However, since they wrote, there was found at Water Leaf, a Black-on-white site on the lower Chama with strange, atypical little kivas, a neatly-made, well-preserved adobe and stone mealing bin. Its three metates had been removed before abandonment of the pithouse on whose floor it had been built. Living rooms were later erected over it (Luebber in Wendorf 1953:21, Fig. 8, Pl. VI).

There seems to be an equal paucity of references to metate bins in later sites. Morley (1910) records none at Puyé, nor did he and I find any at Tuyonyi. No bins have been reported from other Pueblo IV ruins of the Pajarito Plateau, but it should be remembered that the considerable amount of digging done in several of them has been most inadequately published. Pueblo IV sites on the Chama: Po-shu-ouinge (Jeançon 1923) and Te'ewi (Wendorf 1953), both conscientiously described, yielded but one doubtful single-metate bin at the latter. Lambert (1954) found none in either the prehistoric or colonial pueblos at Paa-ko, east of the San-dias. Nelson (1914) uncovered none in his excavations at a number of ruins in the Galisteo country. The same was true at the ruined Jemez pueblo, Unshagi, where the only so-to-speak in situ metates discovered by Reiter had merely been propped on stones to the proper angle (1938:163). This was probably a temporary makeshift.

All in all, and strange as it seems, one must suppose that grinding was habitually done, and practically all bins were built, in upper rooms. For bins of some sort there must have been, because throughout the Upper Rio Grande from at least middle Pueblo III on, metates were of the so-called "flat" type, with upper surface concave from end-to-end, but very little or not at all laterally. Thus, they lacked raised edges like those of the earlier, longitudinally troughed local form (Kidder 1932, Fig. 43), or the scoop-shaped metates open only at one end of certain other areas.

In the Upper Rio Grande, bins for the storage of maize have been most frequently found at the ruined Jemez pueblo of Unshagi, in its strange class-C ground-floor rooms, the two front corners of each of which held a masonry bin. There was a ventilator-like opening in the wall opposite the space between the bins and in that space stood a deflector, usually terraced, with a firepit close behind (Reiter 1938:56-59, 67-70; Figs. 4-6; Pls. VI-VIII). Such an axial alignment of features characteristic of kivas gives these rooms a strongly ceremonial look. Their large number and their arrangement in long rows, plus the fact that Unshagi seems to have been adequately supplied with kivas, led Reiter to feel that their function was primarily secular, probably for storing maize in well aired quarters where it could be heated, and so dried, when necessary. He considers many of the rooms in which these bins occurred to have been the lowermost of three stories, others to have borne a second story, only a few to have had no superstructure (idem: Fig. 4). As

nothing suggesting built-in chimneys was noted, nor series of fallen chimney-pots like those of Pecos, one wonders greatly about smoke-disposal.

Reiter's belief that the Unshagi bins were receptacles for maize is substantiated by the presence of practically identical arrangements in rooms of the not too distant Gallina sites in the Chama drainage. In some of those that had been burned, the bins were full of charred ears (Hibben 1938:136, Pl. 8, Fig. 1). The arrangement of corner-bins, deflector, firepit is so closely similar to that of the class-C chambers of Unshagi that some connection must be postulated, in spite of the considerably greater age attributed--I wonder if correctly--to the Gallina sites; see also the excellent article on the Evans ruin in the Gallina country by Lange (1956).

I have gone into the matter of maize storage and metate bins for its grinding at some length, but far from exhaustively, even for the Upper Rio Grande, in order to call attention to the need for locally detailed as well as widely comparative studies of all aspects of the aboriginal use of this outstandingly important cereal. Americanists do not need, of course, to be reminded of the part that maize has played in the pre-Columbian history of the New World. Nevertheless, little serious research of the types just suggested, especially comparative, has been accomplished.

General plans for maize study should be worked out in conjunction with botanists, geneticists, agronomists, nutritionists, students of Latin American history. Of this group, such men as Mangelsdorf, Anderson, Sears, Sauer, and many others have gathered essential data and have formulated problems, many of which are of vital interest to us. On our side, we could contribute to the pool much more than we have as to present-day customs of the less acculturated groups that depend on maize--farming practices, handling of the crop, preparation of the grain and implements used, cookery and utensils, sorts of food produced. A brief, topically arranged questionnaire covering these points would permit workers among living peoples, students whose principal interests lie in other fields, to gather, so to speak on the side, data bearing on various general and theoretical problems. Archaeologists, possessed of such information, could more intelligently interpret their finds and also add significant data as to the distribution, nature, and especially the chronology of metates, manos, mortars.

The find in central Mexico of maize pollen of pre-human antiquity (Barghoorn et al., 1954) and the discoveries in northern Mexico and southwestern United States of very primitive types, the so-called "Bat Cave" maize and others akin to it (Mangelsdorf and Lister 1956), seem convincing evidence of the New World origin of this plant. It may be, of course, that an ancestral wild form existed in both South and North America, and that this could have been brought under cultivation independently in each continent. But even if such a wild maize were so widely available, it appears to me most probable that it was developed

into a food crop on but one side of the Isthmus, whence it was diffused to the other. If so, the evidence up to now at hand seems to be strongly to favor the north.

The problem of where and when maize was domesticated is naturally of primary importance. Only little less so is that concerning what appears to be a fundamental difference in the treatment of maize as between the stone metate-mano area of the Southwest, Mexico, and a so far ill-defined part of Central America, on the one hand; and, on the other, the vast wooden mortar-using area of South America, the Antilles, and central and eastern United States. This seemingly real dichotomy has never, I think, adequately been stressed. I suspect that it goes beyond the reduction of the grain and may be found to obtain in cookery and kitchen utensils. This is a lead, the following up of which would, I feel sure, have surprisingly valuable results for the understanding of New World prehistory.

Not hemisphere-wide, like the foregoing, but certainly of significance, is the difference within the metate-mano area between the dry-grinding of the Southwest and the crushing of lime-softened grain practiced further south. This is fundamental, not only in the working of the maize, but also in the sorts of food produced. Where the dividing line falls, I do not know. I suspect somewhere in southern Chihuahua, but that is pure guesswork.

Still another problem of distribution that needs working out concerns tortilla-making and the flat pottery comal which must, I think, always have been used to cook tortillas. The unknown pre-Columbian range of the comal--but here I must get back to Pecos, leaving these humble, but I am convinced most basic, matters to a younger generation of anthropologists.

KIVAS OF PECOS

Victor Mindeleff, in his classic work, "A Study of Pueblo Architecture: Tusayan and Cibola," says of the kiva:

"The widespread occurrence of this feature and its evident antiquity distinguish it as being especially worthy of study....as embodied in its construction may be found survivals of early methods of arrangement that have long since become extinct....." He goes on to state that at the suggestion of Major J. W. Powell the kiva, instead of being called an estufa or referred to by some English descriptive term, came to be known by its Hopi name in all anthropological writings; Mindeleff himself apparently becoming the first to use it (1911:111).

The first Spaniards to enter the Pueblo country were much struck by the kivas, which were structures of a sort they had not seen in Mexico. I quote Castañeda's description: "The estufas belong to the whole village. It is a sacrilege for the women to go into the estufas to sleep. The young men live in the estufas, which are in the yards of the village. They are underground, square or round, with pine pillars. Some were seen with twelve pillars and with four in the center as large as two men could stretch around. They usually had three or four pillars. The floor was made of large smooth stones, like the baths they have in Europe. They have a hearth made like the binnacle or compass box of a ship, in which they burn a handful of thyme at a time to keep up the heat, and they can stay in there just like a bath. The top was on a level with the ground." (Winship 1896:518, 520-21). Coronado, in a letter to the King (idem: 587), says: "They all have hot rooms underground which, although not very clean, are very warm."

The word estufa, which ordinarily means stove, is given a secondary definition in the dictionary of the Real Academia Española as the sweating room of a thermal bath. This of course was what Castañeda had in mind. He was doubtless familiar with the sweat-baths of the Aztecs and other Indians. As a matter of fact, however, the kivas, so far as I am aware, never served this purpose. But the term stuck for all subsequent mention of these structures in Spanish writings.

Speaking of the kivas of Braba, which Bandelier identifies as Taos, Castañeda says they are, "the finest hot rooms or estufas that there are in the entire country, for they had a dozen pillars, each of which was twice as far around as one could reach and twice as tall as a man" (idem: 511).

Although Castañeda seems to have been a trifle mixed as to the number and placement of the very large pillars, it is evident that the kivas of Taos were most impressive. One wonders if those referred to by him served as "great" or "big" kivas. At Taos today, the kivas, according to Florence Ellis (1950:287) are of the "little" type. In her very inter-

esting paper, however, the distinction between "big" and "little" is based more on function than on size. As a matter of fact, the six present Taos kivas seem, from aerial photographs, to be relatively small (Stubbs 1950). Incidentally, they, and the six at the nearby Pueblo of Picuris, are the only round, subsurface examples that survive.

Round Kivas

At Pecos, there was done more or less excavation in seventeen round kivas and four of the peculiar, approximately square, above-ground structures that I call guardhouse kivas. On the plan of the northern part of the site (Fig. 21) twenty-two of the round sort are given numbers, but several included in the original numeration, although positively located, were not dug. The practically certain position of several others was evidenced by circular depressions. These are shown in dotted line. A good many more doubtless exist, for of seven that we encountered in the course of trenching there was no surface sign whatever and de Sosa stated that there were sixteen at Pecos at the time of his visit in 1590 (Hull 1916:321).

Of the round kivas investigated, ten were completely or practically completely cleared. On, or rather in, most others only enough was done to make certain that they actually were kivas and to learn, from potsherds in the material filling them, when they probably had last been occupied. I did not like to do more because those that I opened suffered severely from rainy-season cloudbursts. Several times a kiva we were working on, or had just emptied, was filled to a depth of two or three feet, the water draining in from all sides. This could be pumped out (Fig. 59b) but it took so long for things to dry that there often came a second flooding and the adobe mortar of walls and firescreens became so soft that there was much slumping and great danger of major collapses. And, as was said in discussing the excavation of the dwellings, I hesitated to bare to the destructive forces of rain and frost parts of the ruin which could eventually be stabilized and roofed.

I have retained the serial numbers, given the kivas as they were located or excavated, because they are so designated in the field notes, maps, and photograph file in the Museum of New Mexico. But they are here treated as nearly as I was able to ascertain in the order of their construction.

First is described Kiva 6, one of the only two we found that had been both built and abandoned during the Black-on-white phase. The other is Kiva 10, but it was so almost completely destroyed by the later Kiva 11 that no diagnostic features remained and it is noted along with the latter. Following number 6, there is presented Kiva 5, surely built in Black-on-white times but kept long in use.

No Glaze I kiva was recognized at Pecos and the only one of that phase now known in the valley is the strange, and I think atypical struc-

ture discovered by Dr. Holden at the Arrowhead Ruin (Fig. 18). Kivas 3 and 18 probably and 21 certainly were dug in Glaze III. Unfortunately, very little excavation was done in Kiva 3, and none at all in 18 and 21, so that we know neither what they may originally have been like, nor how long they were kept in use. Next come Kivas 11 and 8, which were both built and abandoned in Glaze IV. Then numbers 2 and 17, the period of whose founding was not ascertained, but which were given up and filled with rubbish during Glaze IV, as were probably numbers 15 and 9 as well. The possible significance of this seemingly almost simultaneous going out of use of so many ceremonial chambers will be discussed below.

I then describe Kivas 4 and 13, the time of whose origin is again more-or-less uncertain, but which were occupied toward, but not quite until, the last days of Pecos. After them come numbers 1 and 7, apparently in use until the end; next 16 and 14, the only kivas surely known to have been built well on in historic times. Then, last of the round sub-surface structures to be considered, is the very large, atypical Kiva 12, only slightly older than 14, but, if indeed it was to have been a kiva, never finished. Following these, I list the unexcavated Kivas 19, 20 and 22. Of none was the age established, but their locations were definitely fixed. Lastly, come four of the peculiar square or squarish above-ground structures I call guardhouse kivas.

Kiva 6 (Figs. 40, 41a). This kiva was perhaps founded earlier than any other encountered by us at Pecos. Built in Black-on-white times, it was abandoned before the end of that phase. The establishment of others may have taken place at more or less the same time, but only in the case of Kivas 5 and 10 could one be certain of this. Kiva 5, as will be shown, remained in use for a very long time, during which it underwent many changes. Kiva 6, however, having been but briefly occupied, is an unmodified example of early kiva construction at Pecos. How typical it may be cannot be told until others of the same age are excavated.

The chamber lay at about the middle of the west side of the plaza (Fig. 21). As no sign of it appeared on the surface, its presence was not suspected until the 1920 crosscut trench encountered the outside of the southeastern part of its wall. Even then we were far from sure that we were coming upon a kiva, for the structure at that point was in so ruinous a condition that it was difficult to decide whether or not it had the characteristic curve. The masonry was therefore recorded and cut through, and work was continued. Not until the trench had been run 20 feet farther west, through ever-deepening deposits, did we meet the better preserved and obviously curving west wall, and feel certain that we were in a kiva. We first cleared the entire south half, leaving a straight face on the north side of our trench to permit stratigraphic observations. Later we removed the north half of the fill.

Kiva 6 was almost perfectly circular, 20 feet 9 inches in diameter. It had been dug into the red clay slope which covered that part of the mesilla and which rose to meet the rimrock along the west side of the

plaza. There was apparently sufficient depth of clay at this point to permit the excavation of a wholly subsurface kiva, for a 3-foot test hole sunk through the floor failed to reach bedrock; but the slope was so steep that placing the room entirely underground would have entailed an undue amount of digging on the uphill western side. That part of the kiva, accordingly, was sunk 9 or 10 feet and the east side to a depth of only about 4 feet. Much of the eastern part must therefore have stood clear (restored in dashed line in Fig. 40).

The original height of the roof cannot be made out but that it was at least 7 feet 6 inches is certain, for a portion of the west wall still stood to that height. The masonry, as in all ceremonial chambers at Pecos, was exceedingly poor, and composed of large, irregularly shaped stones, vaguely coursed and laid in large amounts of adobe and red clay mortar. No care whatever was exercised to bring the outside of the underground part of the wall to an even face, for that surface was, of course, in contact with the rough sides of the original excavation and entirely hidden; the inner surface, while by no means smooth, was laid fairly true. The chinks between the stones were filled with adobe and such irregularities as existed were masked by a smooth, half-inch, yellowish coat. This formed the base for the plaster, five layers of which still adhered to the lower parts of the wall. The original coat was white, with a 2-foot 6-inch dado in bright red. Overlying this was a well-smoothed coat of rich lemon yellow, so fresh and unsoiled that it evidently was quickly covered by the third coat. The latter was presumably white, as were the fourth and fifth, but each was so blackened by smoke and dirt that the original color could not be made out. The three later applications of plaster were less well rubbed down than the first two.

Kiva 6 is peculiar in having had at least three, and probably four, ventilators. The largest was in the orthodox position at ground level at the middle of the east side. It had an adobe-rimmed aperture at floor level, 10 inches wide by 8 high, opening into a horizontal passage the former length of which could not be determined, as it was almost entirely broken away. This aperture was much smaller than the usual ventilator orifice, but careful examination showed that it had once been 18 inches wide by at least 16 high, having been reduced to its final dimensions by building its sides out and its top down with adobe mudded over small round sticks (Fig. 40). A second ventilator opened in the north wall at 7 inches above the floor. It was 8 inches square and ran back 12 inches, where it turned and rose vertically just outside the kiva wall, the rising passage or flue being 10 inches square. The west ventilator opening was closely similar, but was 1 foot 8 inches above the floor; it was 7 inches high, 10 inches wide, and entered horizontally 1 foot 2 inches before turning upward. The ascending shaft was round and 9 inches in diameter. The ascending shafts of both the northern and western ventilators were broken away some distance below the surface of the ground, so that we were unable to study their upper parts. It is probable that a fourth ventilator existed at the south, for the wall at that point was broken down in

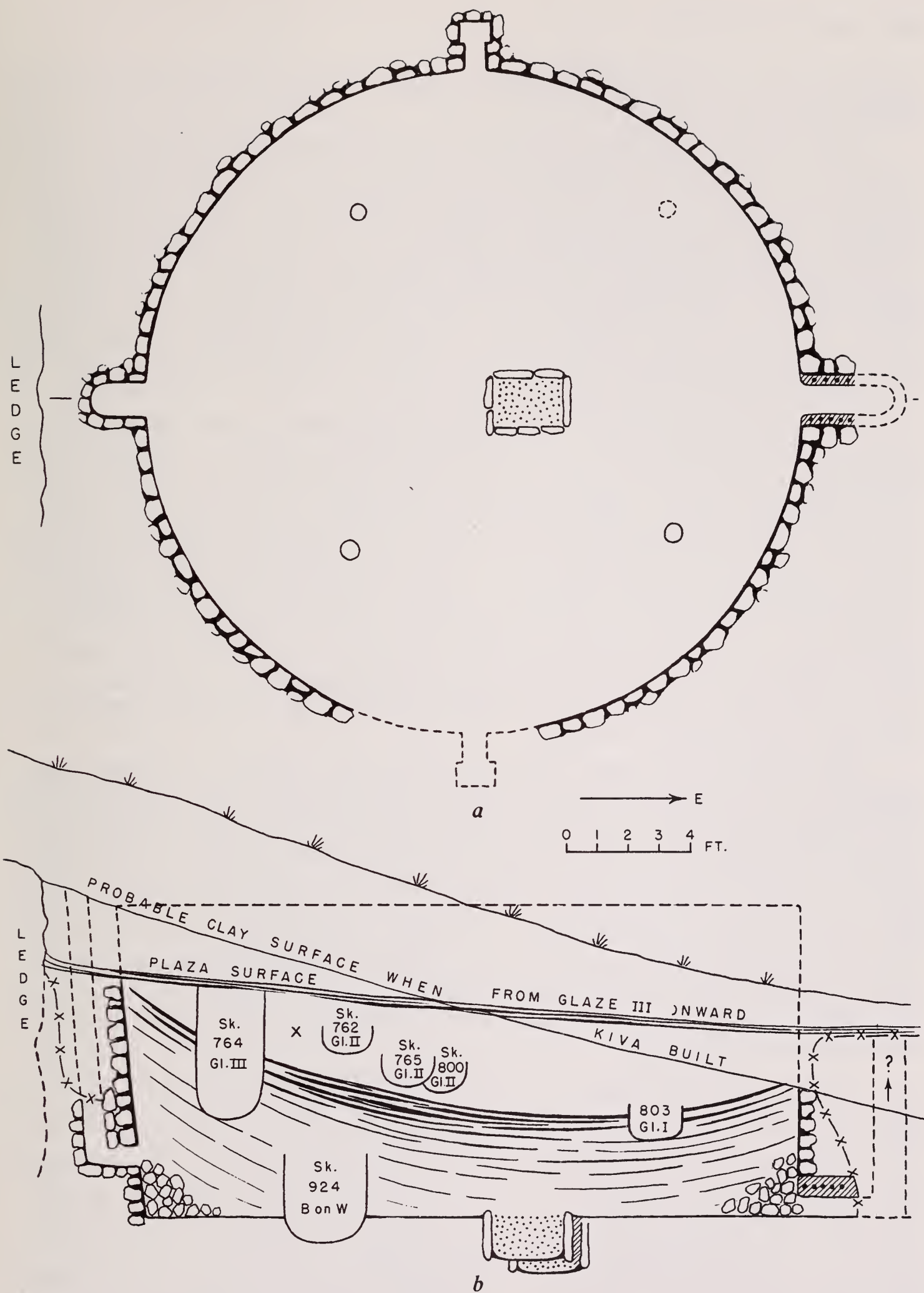


Fig. 40. Kiva 6. Only kiva found with multiple ventilators. Built and abandoned during Black-on-white phase (note Skel. 924). Dark-topped layer of fill deposited prior to Glaze I (note Skel. 803); x, in section, deepest sherd of that ware found in undisturbed rubbish.

such a way as to suggest that it had been weakened by the presence of an opening through it.

There were no niches or recesses in the masonry, but there had formerly been a little cubbyhole 3 feet east of the north ventilator, and a little less than 2 feet above the floor. Its presence was discovered while we were cleaning the wall, one of the workmen noticing a small circular patch of lighter-colored plaster. On cutting this away, there appeared a neat round hole 4 inches in diameter plugged with a tight-fitting stone. Our find a few days before of an idol in a sealed recess in Kiva 5 led us to expect a ceremonial cache but the small box-like cavity into which the round hole opened was empty. It was 6 inches square and was nicely made of five smooth stone slabs.

The floor was of hard black adobe, well smoothed and curving up slightly to meet the wall. There were no loom-loop holders such as occurred in several later kivas. At the three places indicated in the plan were post-holes 4, 5, and 6 inches in diameter. They ran down 1 to 2 feet into the clay subsoil, and the casts of the posts themselves could be made out in the fill extending 2 or 3 feet above the floor, round vertical holes empty at the top, but filled toward the bottom with the soft red debris of rotten wood. It is probable that these helped support the roof beams and that there had been a fourth northeast of the firepit, but no cast of it was noticed during the excavation of the fill, and the floor at that point was in such bad shape that one could not be certain whether or not there had been a post-hole.

The firepit lay a little east of the centre of the kiva. It was a rectangular bin of sandstone slabs joined at the corners, and more-or-less coped with adobe. It measured 28 inches east-west, 18 north-south (inside dimensions), by 18 deep, and was full of hard-packed, clear white ashes in which were twenty or thirty small chips of gray and white flint. An older firepit, partly below and partly to the southeast, was of exactly the same size and construction. The upper parts of its walls within the later pit had been destroyed, and the slabs of the remaining two sides were broken off just below floor level (Fig. 40b). There was no deflector, no ash repository, nor was there the usual stone, cupped by grinding, south of the firepit.

Kiva 6 undoubtedly served its builders for some years, as witness the old fireplace and the remodeled east ventilator; but on the other hand its walls bore few coats of plaster and there was but one distinct floor. The nature of the fill also shows that abandonment came early, because the chamber was cumbered with pure Black-on-white debris thrown in from the west side (as was clearly shown by the dip of the strata) until it was 5 feet deep against that wall and sloped down to meet the eastern wall 2 to 3 feet above the floor. This evidently took place shortly after the kiva had been unroofed because Black-on-white rubbish covered and protected the plaster of the lower walls before rain had had a chance to wash it off. That the roof had been removed is indicated by the fact that the dumpage was from the side, for material thrown down through a trap-

door in the roof of a room or kiva forms a heap directly below, its upper strata sloping downwards in all directions from that spot; but if the fill, as in this case, comes from the edge of a roofless chamber, it first piles up along the wall and later fans out across the floor. The place then stood partly choked with debris for some time, the plaster was weathered from the exposed upper walls and some parts of the walls themselves fell inward. This disintegration and the gradual accumulation of more rubbish eventually resulted in the complete filling of the kiva to the general level of the plaza, and it then became covered by the plaza floor, a layer of hard-packed, dirty adobe.

Kiva 6 was used for burials as well as a dump. No less than 15 were found in the fill: 4 small infants, 2 adolescents, 5 male and 4 female adults. The earliest (Skel. 924, ad. m.) dated from Black-on-white times, the grave having been dug when the rubbish was apparently about 2 feet deep. The shaft was continued through the kiva floor, and the body lay in a scoop into the virgin red clay (Fig. 40b). Phase identification was made certain by mortuary pottery--a Black-on-white bowl and a large sherd from an early type cooking pot.

Subsequent to the burial of Skel. 924 there was deposited rubbish containing an unusually large amount of charcoal, which formed a well-defined dark layer across the kiva 3-5 feet above the floor. Just above the charcoaly earth there appeared a single Glaze I Red sherd in a small patch of seemingly undisturbed rubbish (x, Fig. 40b). Only Black-on-white fragments were in the charcoal or below it, except where grave-shafts had penetrated. Above the charcoal, however, the deposit, although containing much Black-on-white and some Glaze I, was, save in a few places, badly mixed by the churning effect of grave digging. Most of the interments were of Glaze II date, but there were some of late Glaze I. No Glaze I Red pots, however, accompanied these skeletons, all being Glaze I Yellow, a late development of the style. There was one Glaze III burial (Skel. 764, adol.). In most cases the grave shafts could not be followed upward to their point of origin, but that of Skeleton 764 penetrated a number of well-defined ash and charcoal layers and so was traceable for its full depth of 4 feet from the plaza level. This was an unusually deep grave; the shafts of several earlier interments had evidently been much shallower (Fig. 40b).

The churning of the debris by these and other graves resulted, as was said above, in a hopeless mixing of the deposit and the introduction, into what had apparently been late Black-on-white and early Glaze I refuse, of a great deal of later material. Most of this extraneous pottery was Glaze II and III; there were a few Glaze IV sherds, but no Glaze V.

The topmost deposit over Kiva 6 was a heavy layer of stones, adobe-fragments, and earth that had spread down from the buildings to the west when they fell into ruin after 1838. It contained many fragments of Modern pottery.

Kiva 5 (Figs. 41a; 42; 43, 44d, e). Although there is good evidence that this kiva was built as early as the Black-on-white phase, it was kept



p



c



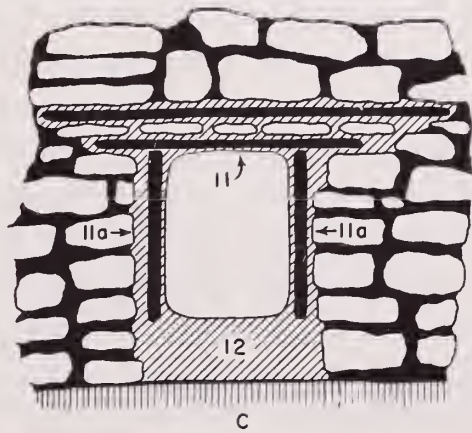
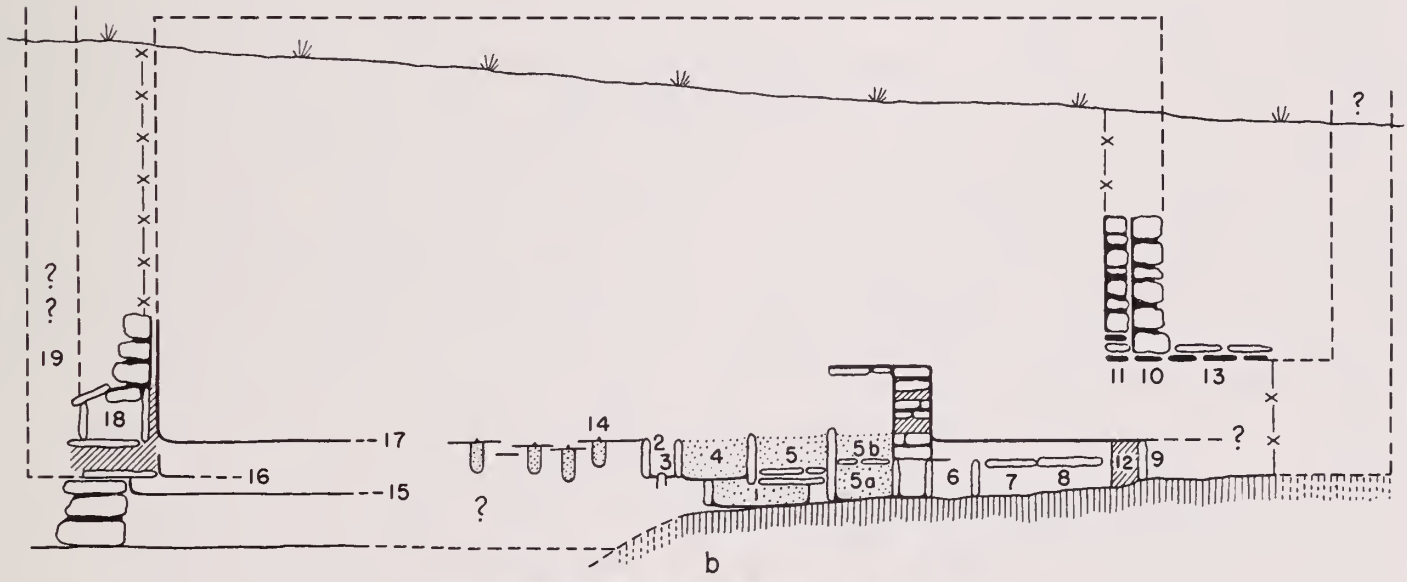
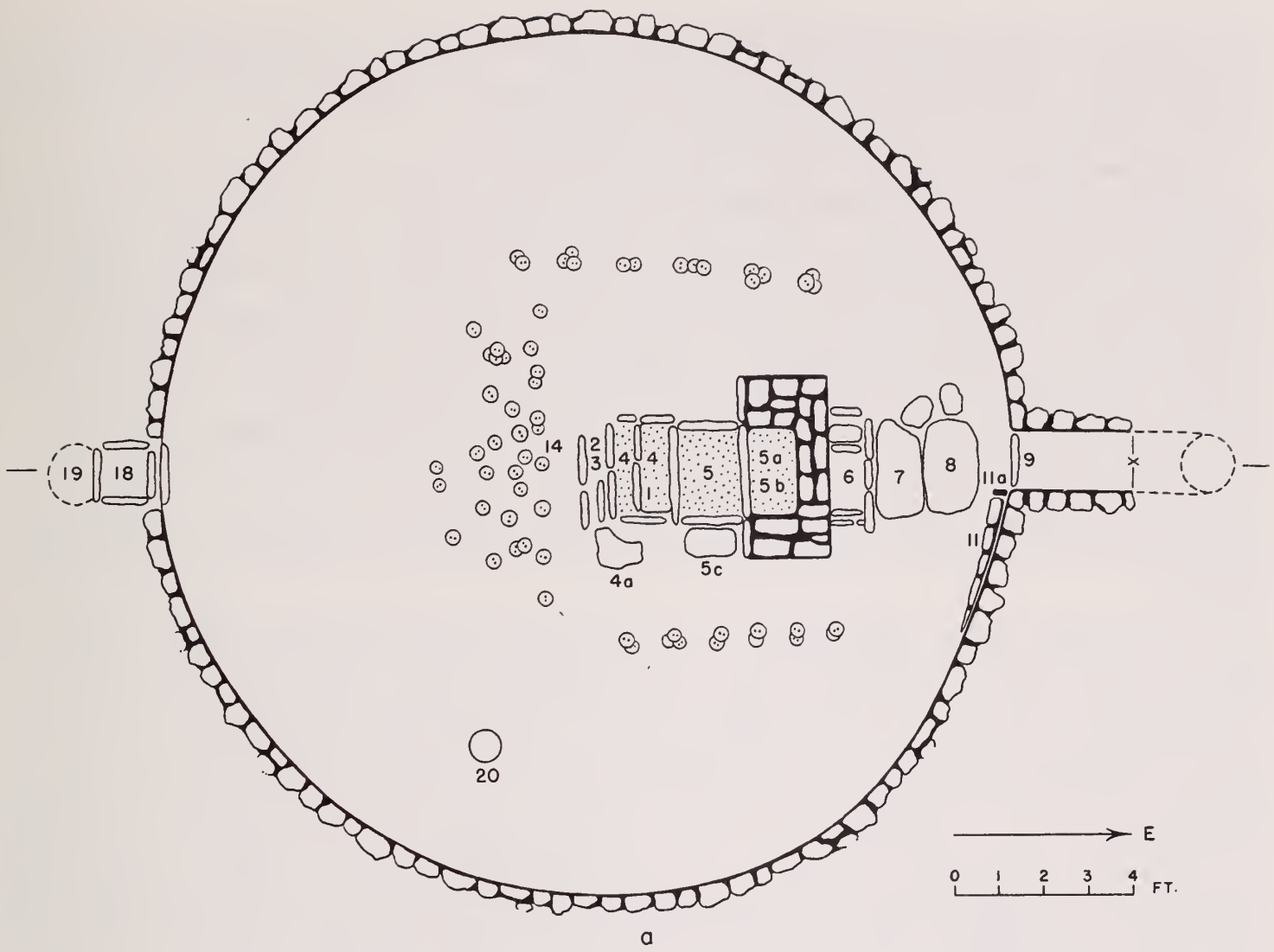
b



a

Fig. 41. Kivas: a, looking northeast across plaza; Kiva 6 with ladder, Kiva 5 at right; hollow of unexcavated Kiva 22; plank runway leads into Guardhouse Kiva J; b, Kiva 10, walls stone-robbbed anciently; c, Kiva 4, slab-floored firepit. At far side of pit, a grinding slab, deflector not yet cleared. At left rear, base of ventilator's vertical shaft (see Figs. 49; 57d); d, Kiva 11 partly excavated, deflector, firepit, southern of two posts, one on either side of ventilator. For plan and section of Kivas 10, and 11, see Figs. 46, 47.

Fig. 42. Kiva 5. Key: 1-5, firepits; 5a, 5b, ash repositories; 4a, 5c, grinding slabs south of firepits 4 and 5; 6, ladder pit east of deflector; original length reduced with vertical slabs and a small horizontal slab; 7, 8, landing slabs; 9, vertical slab in mouth of horizontal passage of ventilator; 10, original wall; 11, short added veneer, a veneer of equal length on north side of ventilator not shown; 11a, wooden jamb of reduced orifice of ventilator; 12, adobe plug inserted when ventilator orifice reduced; 13, wooden slats supporting stone slab roof of horizontal passage of ventilator; 14, row of six loom-loop holders in latest floor (see Fig. 43g); 15, 16, 17, successive floors; 18, slab receptacle for stone idol (see Figs. 43h, 44b); 19, possible supplementary ventilator; 20, post hole; c, in-kiva orifice of ventilator after reduction in size.



in service, perhaps without a break, almost to the end of the pueblo's occupancy. The most recent of its interior fittings therefore conformed to the usages of the post-Conquest centuries.

Measuring about 19 feet in diameter, it lay in the plaza just within the east entryway. There was no depression or other surface indication of its former presence. We found it in 1920 while running the east-west crosscut trench that also encountered Kiva 6 some 16 feet west (Kidder 1924:27). During its long life it underwent many alterations, one of which was necessary, another possibly so, while some of the others perhaps were undertaken to keep abreast of changing fashions in the inner arrangements of kivas. The latter may be of little or no significance, but in view of our present scant knowledge of Rio Grande kivas and the possibility that they may be of interest for future comparative studies, it seems worth while to record as much as we could make out regarding them.

To begin with, Kiva 5 must at first have been only partly subsurface, for when it was built there was probably less than 5 feet of rubbish that had banked up against the walls of Black-on-white phase rooms that lay just to the east. Even when, in Glaze I-II times, the deposit became considerably deeper, the chamber could not have been wholly below ground because its eastern arc had, at the very beginning, been sunk to bedrock; therefore, to have dug into the extremely tough red clay that covers this part of the mesilla from about the middle of the kiva westward (Fig. 42b) would have made it necessary, to keep the floor level, to have cut down into the rock as well. The western arc was founded directly on the clay. Two, in places three, base courses of large stones constituted the first 18 inches to 2 feet of the construction. This kiva's masonry as a whole was of pieces larger and more carefully chosen than were used later; it was also better coursed than was afterward customary. The upper parts of the wall had in places fallen inward, but on the north side it stood 6 feet 7 inches high. Its upper edge in that quarter was so even horizontally that I at first thought it might represent the original top. However, when I found that the lowest floor (15, Fig. 42b) was underlain by 12-13 inches of fill and that the latest floor (17) had been an equal distance higher, it became obvious that to have provided reasonable headroom several more courses must once have been present. As a matter of fact, I think that, as in the case of Kivas 1 and 4, and perhaps others, the roof had been pulled off, bringing down some upper portions of the masonry. This is further indicated by the absence of beams, poles, or slats in the fill, in spite of the fact that this kiva had remained in use longer than others in which much material of this sort had been preserved. The top 4 feet 6 inches of fill was hard-packed dark earth, unstratified and containing nothing but a few bones of sheep and bison. I think this must have been artificial fill, put in and tamped down to level the latest surface of the plaza. Under it, covering the fallen wall stones and in the center nearly reaching the floor, was the clean, finely stratified, sandy deposit we so often found at Pecos in kivas and other depressions that had

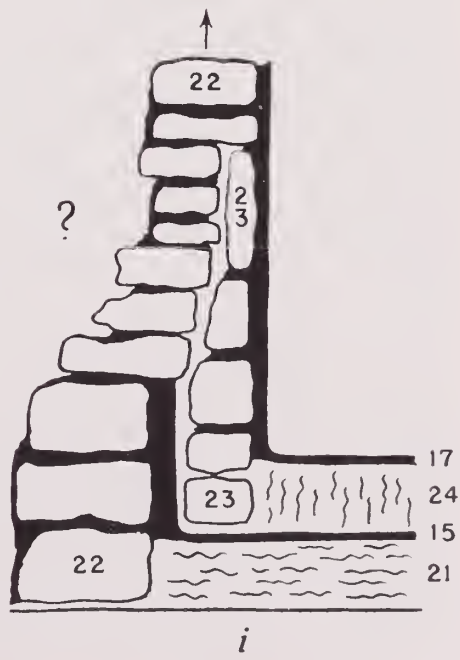
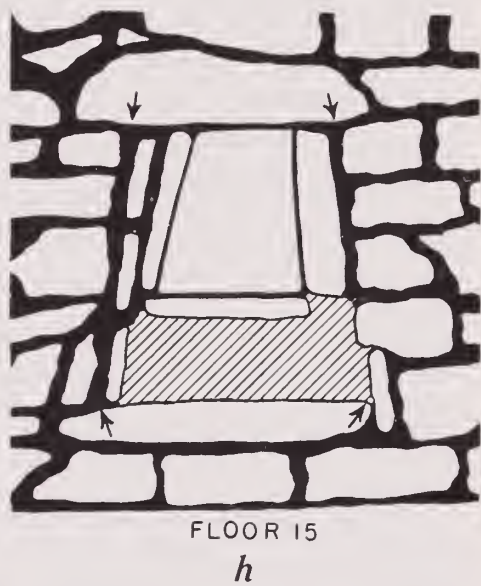
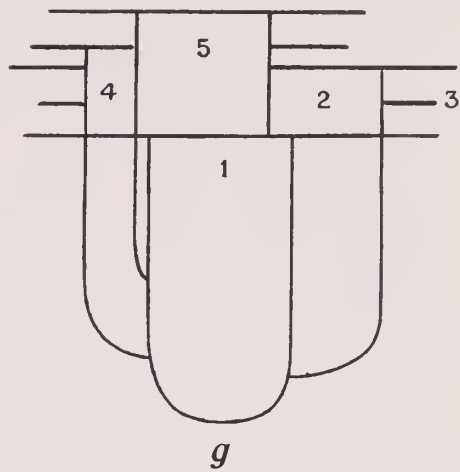
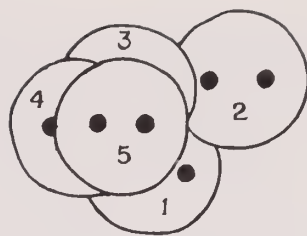
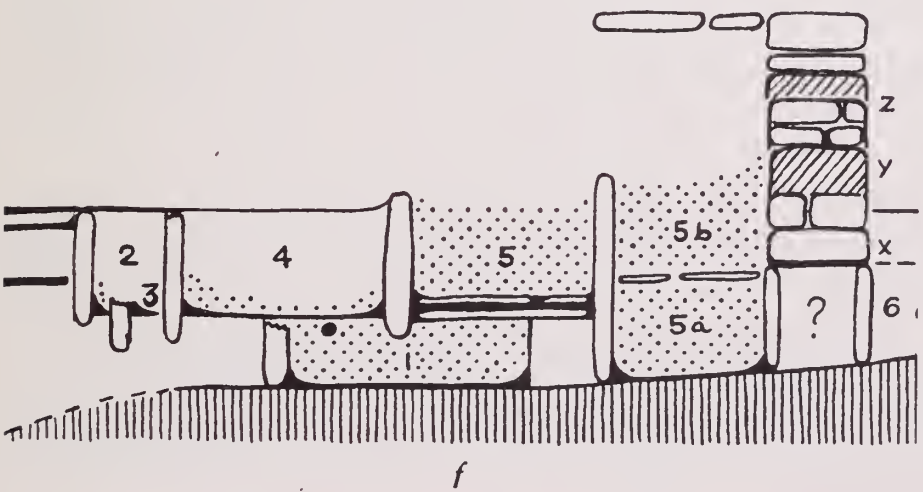
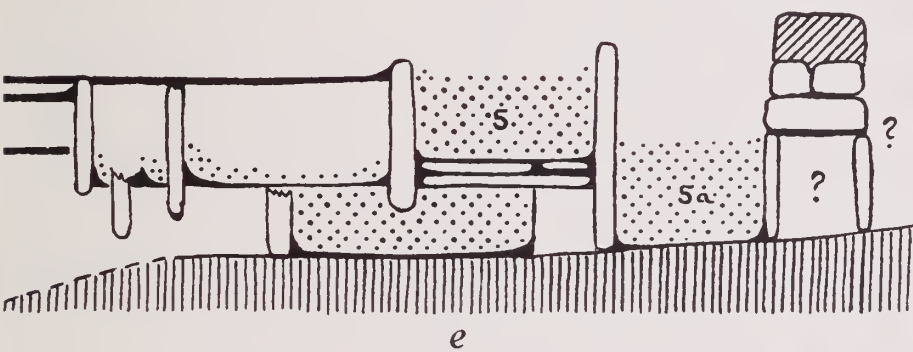
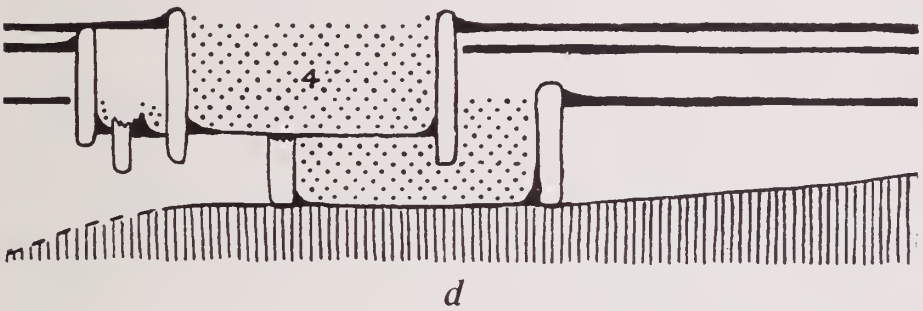
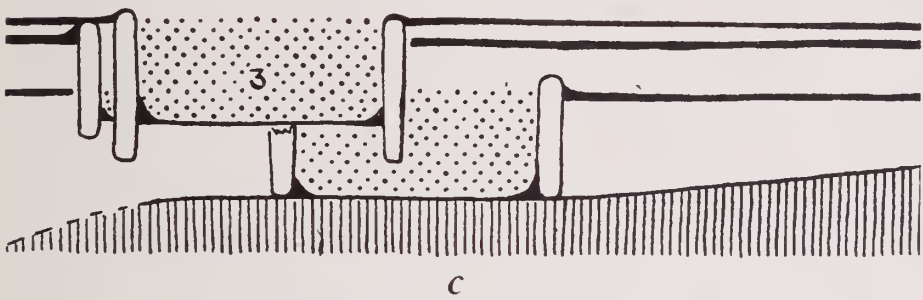
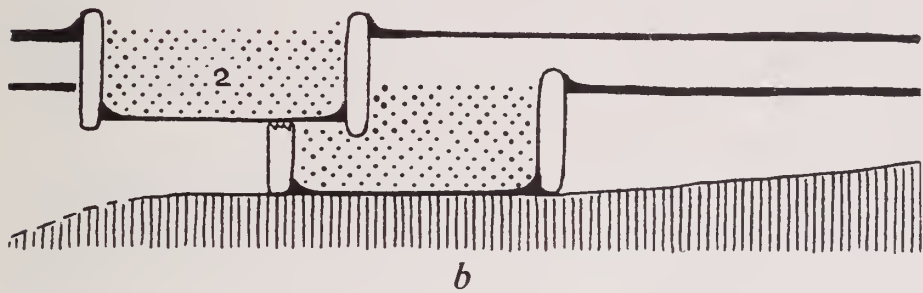
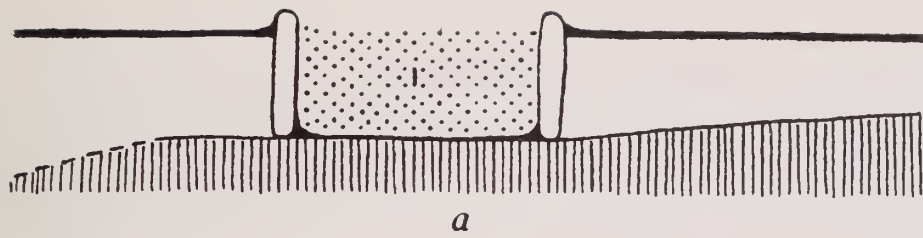
held standing water. On or close to the top of the sand were a few Modern Painted sherds, a type that seems not to have come into use at this Pueblo until after the Revolt of 1680.

To go back to the wall, the high part at the north and another long arc nearly as high at the southwest, stood straight from the foundations upward. But at the northwest and northeast the upper part of the original wall had been pushed in, evidently by pressure of the outer earth. The heavy foundation stones had resisted this pressure, perhaps because they had been laid in a foundation trench, but whether or not this was so I could not determine without destroying the wall. Fig. 43i shows how the inward displacement was remedied and a vertical face restored. It also shows that the trouble occurred relatively soon after the laying of the earliest floor, as the fill put in when the repair was made contained, with the exception of a single piece of Glaze I Red, nothing but Black-on-white sherds.

The above-described alteration is the one I have referred to as necessary. The change which I regard as not certainly necessary, although it may have been made in order to cut down the amount of incoming air, was the reduction in size of the in-kiva orifice of the ventilator. The original orifice had rough masonry jambs, probably smoothed with adobe, and a wooden lintel (10 in Fig. 42b). It was 27 inches high, from the bedrock floor of the horizontal passage, and 16 inches wide. When it was decided to make it smaller, a masonry veneer was laid up on either side and above it (11, shown only on the south side in Fig. 42a, also shown in section, Fig. 42b). This framed, so to speak, the new orifice, which was brought down in size to about 18 inches high and 13 wide by building up at the bottom with adobe (12, Fig. 42b, c) and introducing, flat against either jamb, a small wooden plank 4 inches wide, 1 inch thick, and 18 inches high (11a, Fig. 42a, c). These had completely disappeared through decay, but had left clear, measurable casts in the clayey earth. They supported two wooden lintels with slabs and adobe between (11, Fig. 42b, c). The rotted ends of the lintels were found in the masonry veneer, showing the upper one to have been 37 inches long, 6 inches wide, 1 1/2 inches thick; the lower was of the same width and thickness, 24 inches long.

The horizontal shaft of the ventilator had been walled with masonry on both sides and roofed with stout wooden slats which supported sandstone slabs (13, Fig. 42b). The middle parts of the slats had rotted, allowing the slabs to fall into the shaft. The ends of the slats, in some cases partially preserved, in others recognizable from their casts, had rested on the masonry side walls of the passage. We followed the passage in about three feet--as far as we dared. Its floor was the flat sandstone bedrock. Across its mouth was a sandstone slab 7 inches high (9 in Fig. 42a, b); it had been so placed, probably, to prevent rain water which might fall into the vertical passage from running out onto the kiva floor. Hendron (1940:31, note 54) found a somewhat similar arrangement --pit and slab--in the kiva of the so-called "Ceremonial Cave" in

Fig. 43. Kiva 5, details: a-f, sections showing succession of firepits. For explanation see text. Scale twice that of Fig. 42; g, loom-loop holders sunk into each other as late floor kept being resurfaced; h, stone-slab receptacle in west wall that contained stone idol and other stones (Fig. 44e; 18, in Fig. 42) original size of aperture indicated by arrows; i, vertical realignment of pushed-in northwest part of wall. 21, refuse lying as originally deposited. Only Black-on-white sherds. Heavy basal part of wall resisted pressure, probably laid in foundation trench cut through refuse to hardpan; 22-22, original kiva wall, upper part shoved inward; 15, finishing coat of original wall turning outward to form earliest floor; 23-23, stones realigning wall, masonry above these perhaps remained vertical or may have fallen and been rebuilt; 24, rehandled refuse fill for later floors, all sherds found Black-on-white, except Glaze I Red; 17, late finishing coat and floor; g, h, i, field sketches not to scale.



the Rito de los Frijoles. He states that he experimented, presumably during the National Park Service's stabilization work on kivas there and his restoration of Kiva 16 at Pecos, and found the device successful.

The fill of the horizontal passage was of dark earth with a few animal bones, a Glaze VI sherd and a Modern Painted sherd, and part of a small plain red bowl of late type. We were unable to find in it any floor, other than the bedrock. It is possible, but I think unlikely, that there had been one, continuing the level of the late floor (broken line in Fig. 42b, running east from 9, the "water stop" slab).

One further feature of the wall remains to be described, a sealed recess (18 in Fig. 42) in its western masonry at the level of the latest floor and in the ventilator-deflector-firepit axis. Like the orifice of the ventilator, it had been reduced from an originally larger size to a small box of six slabs. The one that closed its in-kiva side had been covered by the wall's adobe finish with its 12 or so thin coats of greenish plaster. As the plaster dried after excavation, one of our keen-eyed workmen spotted a square of lighter color. We dug into this and found the closing slab (removed and placed to one side in Fig. 44e). Within was a stone idol leaning against the back of the little cubbyhole and, in front of it, three stream-rolled stones of odd forms (Kidder 1932: Fig. 63b) a small stalagmite, and a lump of quartz. The idol (*idem*, Fig. 65b, there mistakenly attributed to Kiva 6), 8 inches high, was of hard gray limestone. It had apparently never been finished.

The orifice of the recess, as has been said, had once been of greater size. It is possible, as shown by dashed lines with two interrogation points (19, Fig. 42b), that when larger it may have been the opening of a supplementary ventilator, like those found in Kiva 6. Whether or not this was so we could not determine without bringing down adjoining higher sections of the wall on either side of the orifice.

The floors of this kiva presented us with a difficult but interesting excavation, a particularly difficult piece of recording, and a number of puzzling minor problems, many of which it was not possible to solve. This was due to the fact that throughout the probably more than four centuries of this small chamber's existence, the members of whatever group to which it belonged kept making changes in its interior arrangements. The result was the installation of at least five, and very likely more, firepits; several additions to the three-sided deflector, which may well have succeeded others; loom-loop holders beyond counting; in addition to the already described working over of orifices of the ventilator and idol repository.

The earliest firepit was sunk to bedrock (1, Figs. 42, 43a; this and following changes most clearly shown in Fig. 43a-f). At a later time the floor was raised some 4 1/2 inches and a second pit, 2, was let into it to the west of and above 1, the operation resulting in destruction of the upper edges of the western lining slabs of 1. The ashes of 1, save where 2 encroached upon them, were not removed. Pit 3, in a floor 1 1/2 inches higher than that associated with 2, lay a little to the east of 2.

The ashes of the latter were entirely cleared out, save from cracks and crannies, and its eastern slabs were removed. The building of 4 resulted in the nearly total destruction of 3, nothing remaining to testify to its former existence but the broken stubs of its western slabs, the immediately adjacent parts of its adobe lining, and a little ash. Pit 5 was located still farther to the east. The ashes were mostly cleared from 4, the tops of its western slabs were cut down and the floor run across them; the eastern slabs were removed. To gain sufficient depth for 5 it was also necessary to do away with the eastern slabs of 1. These were pulled out, leaving the adobe lining and about half of the original ashes in place. The bottom of 5 was paved with two layers of slabs. It is probable that 5a, presumably an ash repository, was established at this time, and that the deflector was erected to the east. The earlier firepits had doubtless also been provided with deflectors, but whether these were three-sided or of simple wall form is unknown, for all traces of them were of course obliterated by the successive eastward moves of the pits and the various resurfacings of the floor. Nor can the at least three stages of growth of the eastern wall of the deflector be correlated with Pits 5, 5a, and 5b. It is possible indeed that 5a constitutes the remains of the eastern part of a firepit even earlier than 1. I believe it, however, to have been the first repository for the ashes from 5, and that for some reason it was covered with the thin slabs shown in Figs. 42b, 43f, and continued in use. Pit 6 lay east of the deflector; I have, perhaps wrongly, drawn it covered by the latest floor. This possibly floored-over ladder pit showed no burning, nor any trace of ashes.

Close to the south side of the latest firepit, 5, there was set horizontally in the floor a flat stone (5c, Fig. 42a), whose slightly cupped upper surface evidenced long use for rubbing or grinding. It had not been brushed clean when the photograph in Fig. 44d was taken, but a similarly placed and worked stone that had been covered by the latest floor appears in that picture to the south of firepit 5 (4a in Fig. 42a). It is probable that each successive pit had been equipped in the same way.

There had been three series of loom-loop holders (Fig. 44d; 14 in Fig. 42a, b), one running north and south to the west of the fireplaces, the other two, east and west on the north and south sides of the fireplaces. The two latter show that each was remodeled two or three times. The series at different distances west of the fireplaces had seen many more remakings, perhaps ten or a dozen. The latest and best preserved line was of six holders, 12 inches apart from center to center.

The holders were set in holes about 4 inches in diameter by 8 to 10 inches deep dug into the floor with a sharp-pointed stick which left vertical marks in the clay sides. Then a flexible withe, probably willow, 1/4 to 1/2 inch in diameter was bent on itself to form a long, narrow loop, its two ends apparently always tied together. This was held by hand in the empty hole with its top about 1 inch above the level of the kiva floor, the knot near, but usually not on, the bottom of the hole. Then white wood ash, worked into a thick paste with water or possibly some plant

Fig. 44. Kivas and kiva ash: a, Kiva 12, looking a little south of west. At middle left a block of fill not removed. Tools are on encircling bench, from which upper wall rises, lower wall runs downward into black shadow; exploratory cut in bench. Western passage runs outward and upward from bench. Beyond passage, west wall of Kiva 14; farther beyond, ruins of south end of west side of Quadrangle. Pecos mesa in distance. For plan and section of Kiva 12, see Fig. 58; b, Kiva 8, looking a little north of west. Slab-walled horizontal passage of ventilator with cedar cross-pieces. At right a roof-support post. In kiva are ladder pit, deflector, firepit; at left of firepit, grinding slabs. For plan and section of Kiva 8, see Fig. 48; c, ash-filled pit in bank of Arroyo del Pueblo, northwest of ruin; d, Kiva 5. View from west after clearing firepits and deflector but before work on orifice of ventilator. Note loom-loop holders in front of and at left and right of firepits; e, Kiva 5, close-up of mouth of stone-slab receptacle in west wall. Closing slab (shown in place at 18 in Fig. 42), here removed and placed on north end of sill-slab of original larger opening (Fig. 43h). Lintel slab served for both original and reduced openings.



a



b



c



d



e

juice, was packed tightly in and tamped down. It preserved perfect casts of the holes and the with loops. In the north and south group, one line of holders, of which only two or three elements had escaped obliteration by later holes, had been filled with clean clay of lighter color than the floors instead of with ash.

None of the holes had been dug from the lowest floor or, so far as could be made out, from an intermediate floor of which traces were noted at several places near the walls (16, Fig. 42b). All had been sunk from a succession of late floors no one of which could be followed for more than a few inches; the former presence and levels of these floors could not have been ascertained except for the slight differences in height of the tops of the loom-loop holders (Fig. 42b, 43g). As in Kiva 4 (Fig. 50c), the holes cut into each other most confusingly (Fig. 43g) and numbers of those in the north-south lot had evidently been destroyed during the various plowings up of the upper floors that were involved, one supposes, in the digging of the several firepits.

There is no doubt that each row of loops served for attachment of the lower bar of a loom, the length of which was evidently about 5 feet. The rows were placed in such positions as to give the weavers full advantage of the light entering the kiva through the hatchway.

Of the Heaven only knows how many floors, or perhaps better termed resurfacings, only the earliest and latest (15, 17, Fig. 42b) could be followed with any degree of confidence. The former was first encountered in the south-east quadrant and followed out from there. In places it was very clear, a hard-packed black surface from which the fill came away in flat-bottomed flakes. As we worked out toward the middle of the kiva it became more difficult and finally impossible to trace. The highest floor lay about 12 inches above, was soft and very hard to follow. Its level, however, was well marked by the tops of the latest loop-holders; also by a line on the sides of the deflector and along parts of the wall whose several coats of greenish-gray plaster turned outward to overlap the edge of the floor.

The deflector (Figs. 42a, b; 43e, f; 44d) was found in fairly good condition except for the entire disappearance of the adobe and plaster with which it had doubtless been finished (cf. Fig. 60a, b, the deflector of Kiva 14, on which these coats were preserved). It was of the three-sided type, surrounding the ash repository (5a, 5b in Fig. 42) on three sides and with projecting slabs that roofed it over (Figs. 42b, 43f, 44d). Unlike other examples of the three-sided deflector it seemed not to have risen at the back above the projecting slabs. It was also unusual in that it reached its final height as the result of at least three accretions, between each of which there had elapsed a certain length of time. The first of these was built up from a floor (x, Fig. 43f) not identified elsewhere in the kiva, of dense gray clay surfaced with several coats of plaster like those of the latest floor. This sub-deflector floor was at the level of the tops of the wall slabs of the ladder pit (6 in Fig. 43f) just east of the deflector and of the large horizontally-laid landing slabs east of the pit

(7, 8, Fig. 42). The above-mentioned first accretion (y, Fig. 43f) consisted of two courses of masonry above which was a 9-inch layer of dark, hard-packed adobe topped with a single coat of fine white plaster. The next addition, z, was again of two courses of masonry, and a 6-inch layer of the same sort of hard, dark adobe. This layer, which, like the white-topped one of the first accretion, ran through the entire structure, was also surfaced with plaster but was so heavily smoked that it would seem to have stood exposed for a considerable length of time. The final addition was of more masonry and the slabs that protruded over the ash repository.

To repeat, there can be little doubt that this very long-lived kiva was built during the Black-on-white phase. No sherds of later wares were in the fill below the earliest floor and, although there were many more in the fill between it and the lowest identifiable floor above, only one was of Glaze I Red. That the kiva was perhaps continuously occupied, and so kept clear of refuse, from Black-on-white times to not long before the abandonment of Pecos is suggested by the fact that with the exception of a single late Glaze IV sherd, on top of the ash in Pit 1 (large black dot, Fig. 43f) there were no fragments of Glazes II to V. The sherds on the water-laid sand that accumulated when the chamber fell into disuse and a few in the earth-choked ventilator were of Modern Painted vessels; a single piece was of Glaze VI.

Kiva 3 (location, Fig. 21). Attention was called to this kiva early in 1916 by a slight circular depression in the East Terrace. I excavated about a fourth of its circumference to a depth of a little more than 3 feet. This disclosed a conventionally curving stone wall and showed the upper fill to be entirely barren. I did not dig deeper because in small pits close by to the north and south were burials on virgin red clay, none over 3 feet below the surface, and it was therefore evident that the kiva had been sunk to much below that level, probably 7 or 8 feet into the terrace. To empty it would have involved an amount of digging I could not then undertake as Guthe had not yet arrived and quantities of graves were daily coming to light in all trenches. These I had to attend to myself, Guthe and I not having, as he and I did shortly after, trained any of our men to clean skeletons. Incidentally, it should be said that several of them, as soon as they learned to judge from the "lay" of the first bones encountered, the probable position of the rest, became remarkably expert at this delicate business.

To return to Kiva 3, although I actually never did clean it out, because of involvement with other kivas, it later became almost certain that it had been dug during Glaze III. Evidence for this, although I did not grasp it at the time, is that in a very thin deposit on the slope some 60 feet directly downhill, a small test exposed a heap of bones from at least five adult skeletons (Fig. 71c). They were on the natural red clay, the highest not over 8 inches down. In two cases there were among them four or five lumbar vertebrae and part of a pelvis lying in order, as well as several pairs of long-bones in proper relationship, but no hand or foot

bones. These remains were surely from burials encountered in digging Kiva 3. They had been buried, although, very shallowly, rather than thrown out on the surface, for none showed marks of gnawing by animals. That some had held together implies that no great amount of time had elapsed before the disturbance of their graves. There were burials of Glazes I, II, and III in the pits on either side of the kiva, but most were Glaze III, so that in view of the evident recency of some of the interments it is highly probable that the kiva was sunk during that period. The individuals buried in the two pits were, for Pecos, unusually generously equipped with mortuary pottery. One (Skel. 214, ad. m.) had been killed by an arrow; its stone point was found embedded in a lumbar vertebrae (Kidder 1932: Fig. 5a).

Had I trenched further up hill I would doubtless have found clay from the terrace that had been thrown out by the kiva diggers, as I did below Kivas 19 and 21.

Kiva 18. In spite of the fact that there was no circular hollow or other surface sign of a kiva east of Room 50b (Fig. 24), I feel sure that the underground passage that once led east from the "cellar" Room 77 and passed under 50b to continue out into the plaza, was headed for a ceremonial chamber southwest or south of Kiva 7 (Fig. 21).

The low, narrow passage had been opened from the surface during Glaze III, for among the sherds in the earth thrown back into the cut after it had been roofed were a few of that phase, probably pieces that had been lying about on the plaza when the trench was dug. There were none later, whereas the deposit on either side of the passage seemed to be the usual Black-on-white, Glaze I, and Glaze I-II plaza sequence. The passage was kept open well into Glaze V, when it, and perhaps also the postulated kiva, was given up and filled with refuse of the latter period. Its entrance into Room 77 was then sealed.

Kiva 21 in the East Terrace was also postulated, again with considerable confidence. A very slight depression (6, Fig. 45) marked its probable location, although this was not noted until the sequence of the deposits on the slope below had made it practically sure that a kiva had existed on the terrace. The observations that led to this belief were made in a routine trench, run uphill in the 1050-E-150 square, one of many dug to test the extent and depth of the great eastern midden. It was cut, as always in such cases, to a little below the surface of the undisturbed red clay of the slope. We soon encountered and removed 16 skeletons, those with mortuary pottery being of Glaze II, III, and IV. Beyond these, we passed through a zone (1 in Fig. 45) without burials, the deposit partly of washed adobe, partly refuse with sherds of Glaze III and later. Under this was a layer (2) with Glaze I Red sherds at the bottom, then later Glaze I, Glaze II and a skim of Glaze III. A little farther up the slope this layer abruptly ran under a mass (3) of red clay and soft green shale, obviously rehandled stuff in which were scattered bones from at least five skeletons, from infants to adults. Sunk into this was the grave (4) of an adult male (Skel. 1724) fortunately, for dating, provided with a Glaze III bowl.

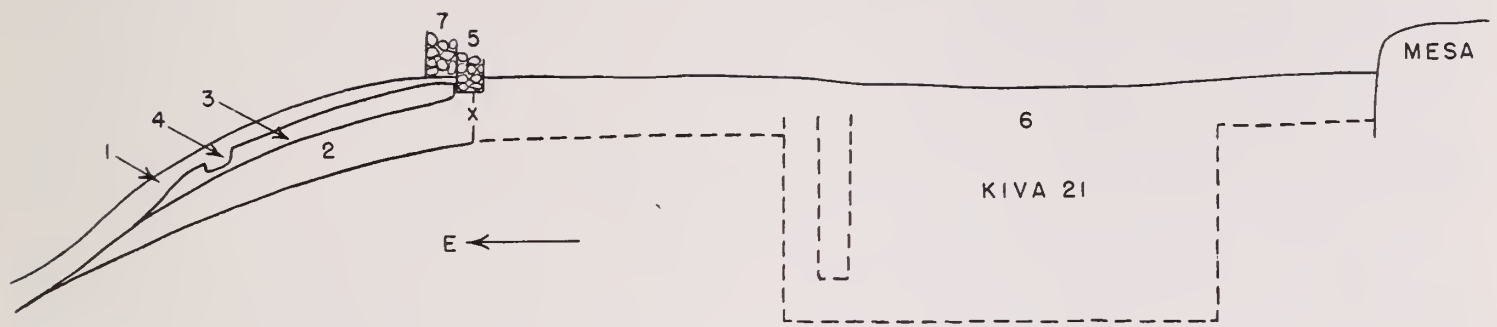


Fig. 45. Kiva 21, not excavated, date of founding determined from strata on slope below: 1, washed adobe and refuse, sherds of Glaze III and later; 2, layer with Glaze I at bottom, II above, slight skim of III; 3, clay from excavation of Kiva 21 with bones of disturbed skeletons originally interred near 6; 4, grave of Skel. 1724 with Glaze III bowl; 5, early defense wall; 6, slight concavity in East Terrace; 7, late defense wall. Not to scale.

We followed the deposit up to the defense wall, or rather walls, for there were remains of two. By then it was quite clear what had happened. In Glaze I, II, and the first days of III, before a defense wall had been built, at least here, rubbish had merely been cast down the bare slope (Layer 2). Then a stone defense wall (5) was run along the top of the slope. This apparently took place early in Glaze III, for a few III sherds (x, Fig. 45) were found close under its base. Then Kiva 21 was dug, a number of graves being disturbed, at and about 6. The bones, the clay and the shale were thrown over the early defense wall (5) to spread (3) down the slope. Then the grave (4) of the somewhat later Glaze III man was sunk into it. Finally, a second defense wall (7) was built against the east side of the earlier one, which had apparently fallen into disrepair. The first wall (5) is probably part of the same old circumvallation that had been cut through by Kiva 1 (Fig. 51). The second wall in this area, was built during Glaze V, sherds of that phase having been found below it a few yards to the south of the trench shown in Fig. 20.

The fact that Glaze III sherds underlay Layer 3; and that a Glaze III burial had been sunk into it proves, of course, that Kiva 21 came into being during Glaze III. How long it remained in use can only be learned by excavation.

Kivas 10-11 (Figs. 41b, d; 46; 47) provided our only example of one kiva cutting into another. The two were found in a part of the West Terrace that was surrounded by the buried ruins of several successive structures, all of which had been drastically beam-robbled and stone-robbled as one followed the other--for the last time, when the Quadrangle was built (Fig. 20). Thus, only stumps of walls remained. The area had first been occupied in Black-on-white times. The plan of the pueblo of that period could not certainly be made out. Later, apparently after an interval when the Pecos had established themselves for a time elsewhere on the mesilla, a double quadrangular Glaze I-II pueblo came into being and was occupied up to and perhaps into the early years of Glaze III. After that the West Terrace ceased to be utilized for dwellings, but burials, which had been made there in very large numbers, particularly during Glazes I, II, and III, were continued through Glaze IV. Progress sheets and general maps of these ruins, mostly dug in 1922 and 1924, and maps giving the locations and serial numbers of all burials, are on file in Santa Fe.

Exploratory trenches in the area in which the kivas lay revealed no living quarters. It seems to have served as a courtyard or small plaza throughout, as did another part of the West Terrace further north, in which a cistern had been sunk (Ci. in Fig. 20). One of the trenches (13, Fig. 46) encountered the exterior of the southwest arc of Kiva 10. The wall, broken down to a height of only 2-3 feet, being of rather carefully selected stones reasonably well coursed, looked to be early and when we sank on the inside, we found that the lowest foot or so of the fill held only Black-on-white sherds.

Putting a small pit down to a series of three floors and through them

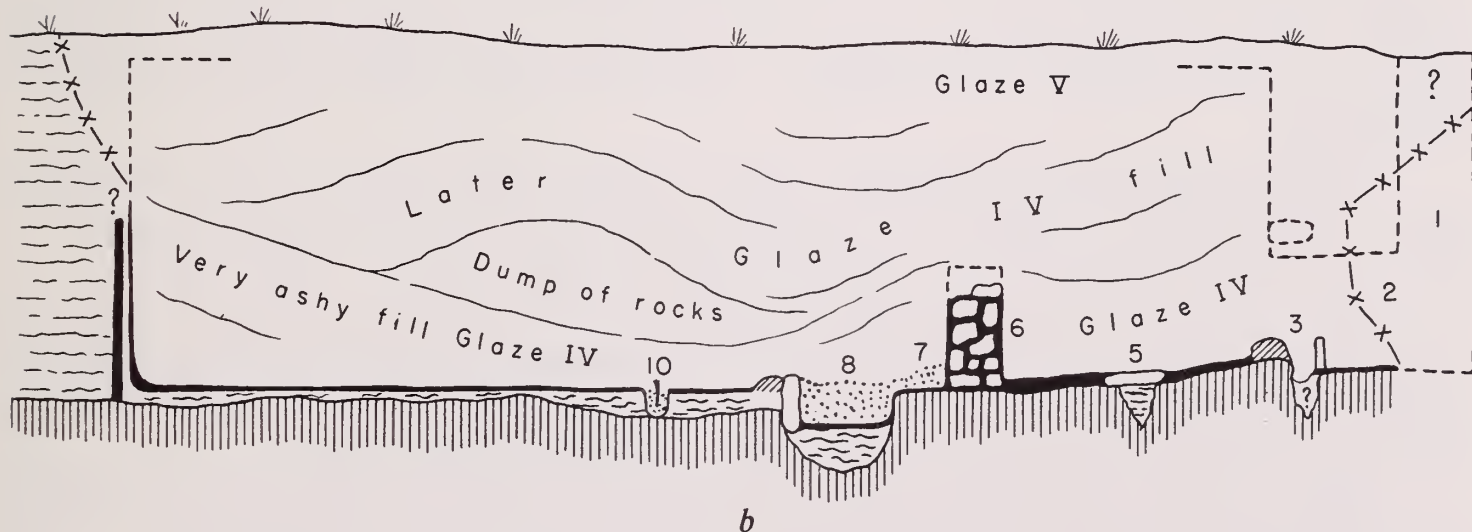
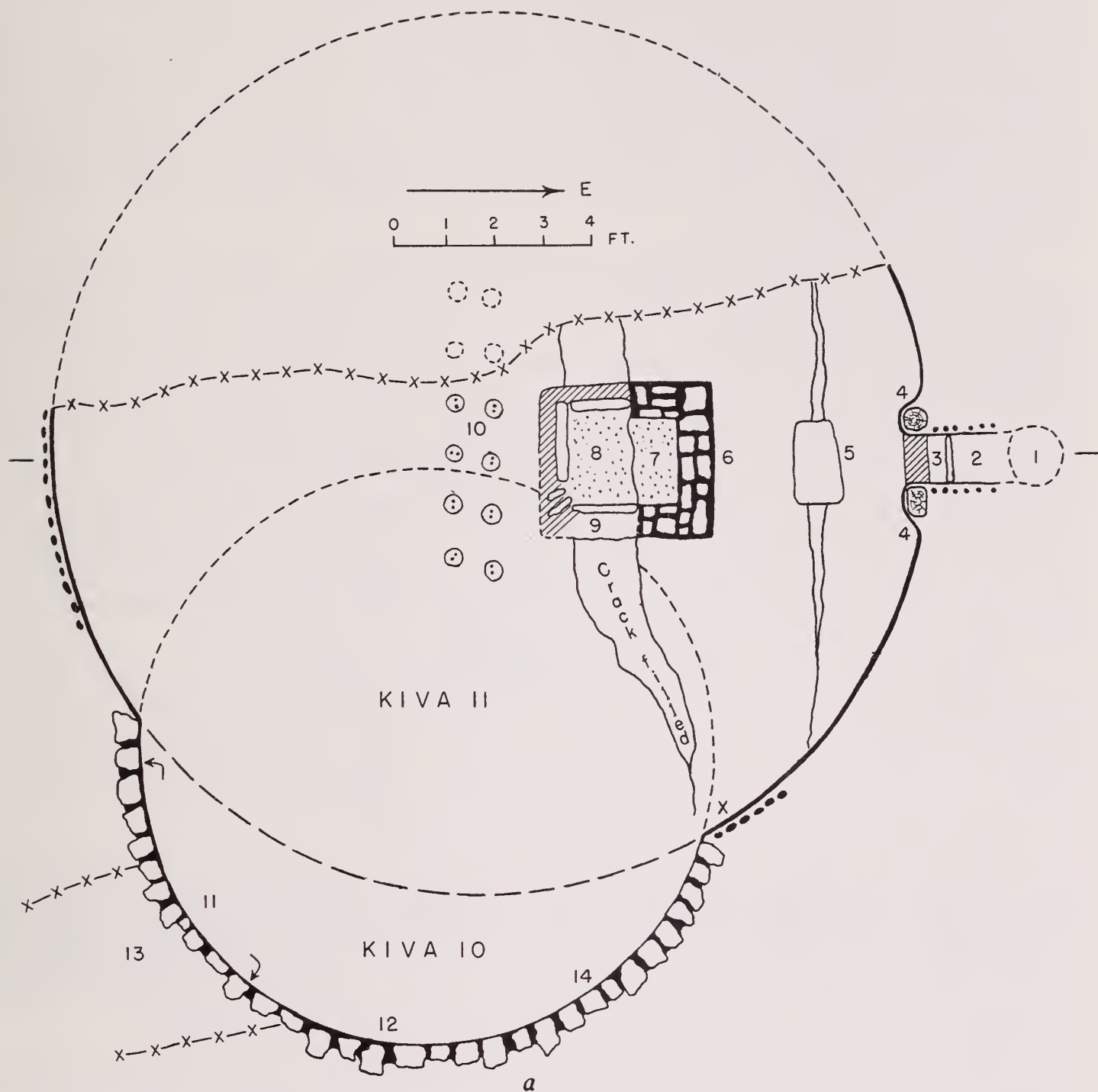
to bedrock, we followed the latter, in a narrow cut, to the northeast in order to get our bearings by locating the firepit. We had gone only a little over 3 feet when we suddenly came into pure Glaze IV refuse that ran from bedrock almost to the surface. I supposed this to have been dumped into a deep hole dug in the kiva fill for some reason or other, during Glaze IV. However, as the cut was widened, the deposit was seen to be streaked with thin layers of ash that did not look to have been laid down in a small hole (see Fig. 41d, a photograph taken later).

Puzzled, as I was so much of the time at Pecos and as I comforted myself by believing that any conscientious excavator must often be, I went back to the wall and followed it north from the place where the trench had met it. After about 3 feet it ended. Gone! Again Glaze IV sherds to bedrock. By this time I should doubtless have realized what had happened. But I did not until I had dug north and northeast, still vainly searching for a firepit, and had then returned to the point of entry and worked along the wall in the opposite direction until it once more came to an abrupt end. But there, across the wall's termination, was an obvious surface of light brown plaster running northeast (x, Fig. 46). It had been backed by close-set vertical sticks about 1 inch in diameter, some partly preserved, others represented only by casts. It was then clear that a second chamber, Kiva 11, had been sunk through Kiva 10, and that the wall of Kiva 11 had consisted merely of the hard-packed early rubbish. The arc across Kiva 10 I had unwittingly let the men dig away!

Kiva 10 had been only about 12 feet in diameter, much the smallest we found at Pecos. As has been said, the masonry was relatively good. The wall had been laid directly on bedrock. A 5-foot stretch (11, Fig. 46, between arrows) was built on a ledge 8-9-inches high, its curve perhaps natural, but more probably so cut, as the rock is soft (seen below white box at mouth of trench in Fig. 41b, in section, in Fig. 47). There was a small square opening through the wall, 9 inches above bedrock (at 12, Fig. 46, see also Fig. 41b). It is possible that this was the orifice of a small supplementary ventilator on the south, like those of the likewise early Kiva 6 (Fig. 40). Digging behind the wall after the picture was taken, failed to show a vertical flue, but, as can be seen in the photograph, the wall at that point is broken down to just above the opening.

Kiva 10 was evidently in use for a considerable time, as there were three floors (Fig. 47). The lowest was the fairly smooth but slightly undulating bedrock with a well-finished 1-inch covering of clay, blackened by what appeared to be an admixture of fine charcoal. Above this, at 1-4 inches according to dips of the bedrock, was a second black floor, the space below filled with red clay in which were lumps of charcoal and bits of sandstone. A third black floor, on a packing of red clay, was 3 inches higher. No plaster remained on the wall, but at its base were many flakes, some white, some smoked, apparently representing a number of coats. There was some 2 feet of rubbish, all Black-on-white, except that near the top of the deposit was a single Glaze I red sherd (x, Fig. 47). The 3 or more feet of earth to the surface had been much disturbed

Fig. 46. Kivas 10 and 11. Kiva 10 largely cut away by Kiva 11, which lacked masonry wall, it having been sunk into refuse, the plastered sides of its pit reinforced in places by small vertically-set sticks. The part of its wall that crossed Kiva 10 was destroyed before it was suspected that Kiva 11 existed. Reference numbers, Kiva 11: 1, presumed size, shape of vertical shaft of ventilator; 2, horizontal passage; 3, water trap in ventilator orifice; 4, 4, posts that probably supported lintel of orifice; 5, landing slab bridging crack in bedrock; 6, masonry deflector; 7, heaped ashes, no pit repository; 8, firepit in crack of bedrock; 9, probable location of grinding slab; 10, loom-loop holders. Kiva 10; 11, arc between arrows, in which wall was built on curving ledge of bedrock; 12, square opening in wall, possibly orifice of supplementary ventilator; 13, approach trench; 14, location of Glaze III burial across broken top of wall (Fig. 41b, d).



by graves, the digging of which had also evidently been responsible for the destruction of the upper parts of Kiva 10's wall. One grave, that of an adolescent male, Skel. 1510, probably Glaze III could be seen actually to have cut into the masonry (at 14, Fig. 46). At the waist of this individual were remains of an interesting textile of cotton cord and yucca fiber (Kidder 1932:302). Within Kiva 10 were fragments from a disturbed burial (Skel. 1490, ad. m.) and the grave of Skel. 1489 (ad. f., both probably Glaze II).

Kiva 11 was just short of 20 feet in diameter. Like Kiva 8 (Fig. 48), it did not have masonry walls, but whereas most of the latter's depth was in tough red clay, Kiva 11 had been cut into an earlier rubbish deposit. Although this, one would think, could not have been expected to stand as well as clay, the builders had reinforced it only in places, and had used sticks, apparently of willow or cottonwood, much weaker and far less resistant to decay than were the cedar slats later found in Kiva 8. None was behind the plaster for a couple of feet beyond where the Kiva 10 wall ended at the northwest. From the other junction the sticks extended for an undetermined distance, but were not present where I made a small breach in the wall south of the ventilator orifice (vertical black cut to the right of the squared post in Fig. 41d).

The finish of the wall, whether applied over a backing of sticks or directly on the rubbish, was 1-1 1/2 inches of fine light brown clay that had been replastered about a dozen times. One coat was bright red, another turquoise blue, another light green, most of the others greenish white. None seemed to have been heavily smoked.

On either side of the 18-inch wide ventilator orifice was a post (4, 4, Fig. 46). That on the south was a squared piece of cedar 3 feet high (Fig. 41d); that on the north, round, probably pine or pinyon, completely decayed. A cast of its lower part was 8 inches in diameter; the height could not be made out. I believe the two had supported a wooden lintel, which in turn bore the section of kiva wall above the orifice.

The wall plaster ran out around the posts and turned inward with small round sticks behind it to line both sides of the horizontal passage whose roof, presumably of wood, had completely disappeared. The passage was full of Glaze IV rubbish. It could only be followed east about 18 inches.

In the mouth of the passage was a north-south crack in the bedrock. East of this was a small vertical slab and on the west there had been built a ridge of adobe, the two forming a water-trap (3, Fig. 46).

The single black floor was laid close above and in places directly on bedrock. When it was brushed clean its southern extent could clearly be made out where it had turned upward to meet the part of the wall across Kiva 10 that I had destroyed (line of long dashes, Fig. 46).

West of the ventilator orifice was a north-south crack in the bedrock that had been bridged by a landing slab (5) laid flush with the floor. The three-sided masonry deflector (6) was founded on bedrock, its north and south arms running to the abrupt eastern edge of a wide crack in which

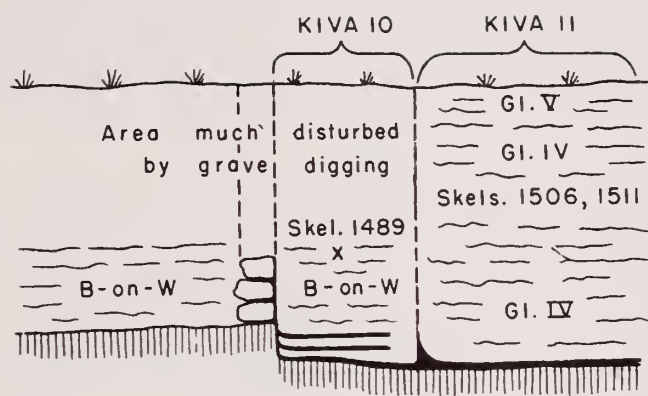


Fig. 47. Kivas 10 and 11. Section on line between points 11 and 13, Fig. 46, showing parts of fill of kivas and of approach trench with levels of certain burials.

the firepit had been built. There was no ash repository, such as had usually been sunk between the arms of the deflector, but ashes (7), removed before the photograph (Fig. 41d) was taken, had piled up on the rock against the deflector. In the ash within the firepit, were many chips of fine white flint. A low, flat-topped ridge of adobe had edged the firepit on the north and probably the whole length of its west side. At the south there was no trace of such a ridge and I believe that space (9) had probably been occupied by a grinding slab which might have been pulled out by us.

West of the firepit was a double row of ash-filled loom-loop holders (10). The fill over one of these was of such a nature as to have preserved a clear cast of the loop. It had been made of a twig a little less than 1/4-inch in diameter; was 1 inch wide on emerging from the ash and rose 3/4-inch above the floor. There was not sufficient depth of deposit above bedrock either north or south of the firepit to have held loop holders. No sipapu was found.

Kiva 11 was but briefly occupied. Built in Glaze IV, as proved by sherds of that period under its single floor, it was abandoned and filled practically to the surface with Glaze IV refuse, in which were made six burials: young child, 1506; two adult males, 1516, 1530; three adult females, 1511, 1522, 1528. With the child was a Biscuit B bowl; with 1528 and 1530, Glaze IV bowls.

Kiva 8 (Figs. 44b, 48) lay about 40 feet south of a sandstone outcrop that runs westward from the south end of the Quadrangle's southwest extension. From the outcrop, the ground falls away toward the gate in the western defense wall (D, Fig. V, Pl. I, Bandelier 1881). Exploratory trenches revealed no house structure on the slope; the nearest living quarters of contemporary date were probably in the above-mentioned extension, some 80 or 90 feet away and at a considerably higher level.

Kiva 8 was found when one of the trenches encountered, at a depth of 4 feet 6 inches, the south side of a row of large upright sandstone slabs from the tops of which flattish pieces of riven cedar ran northward. I at first believed these to be part of a room roof, but they proved to be only about 3 feet, 6 inches long, their far ends resting on a second row of slabs. I then thought they must be the covering of a cist. Further clearing, however, showed that we had come upon the unusually long horizontal passage of a kiva ventilator (Fig. 44b).

Following the passage east, we came to the remains of the round vertical masonry shaft. It had been 18 inches in diameter. Its still-intact eastern two-thirds rose to within 8 inches of the surface. The western third had been supported by a wooden cross-member. When this rotted, the stones of the western third fell into and lay heaped in the eastern end of the horizontal passage which, aside from them, contained nothing but earth that had come down between the cedar slats. These had been set so widely apart that they must have carried something to hold the earth above them. What this had been we could not determine. Certainly not stone slabs; perhaps brush or grass, but in any case some

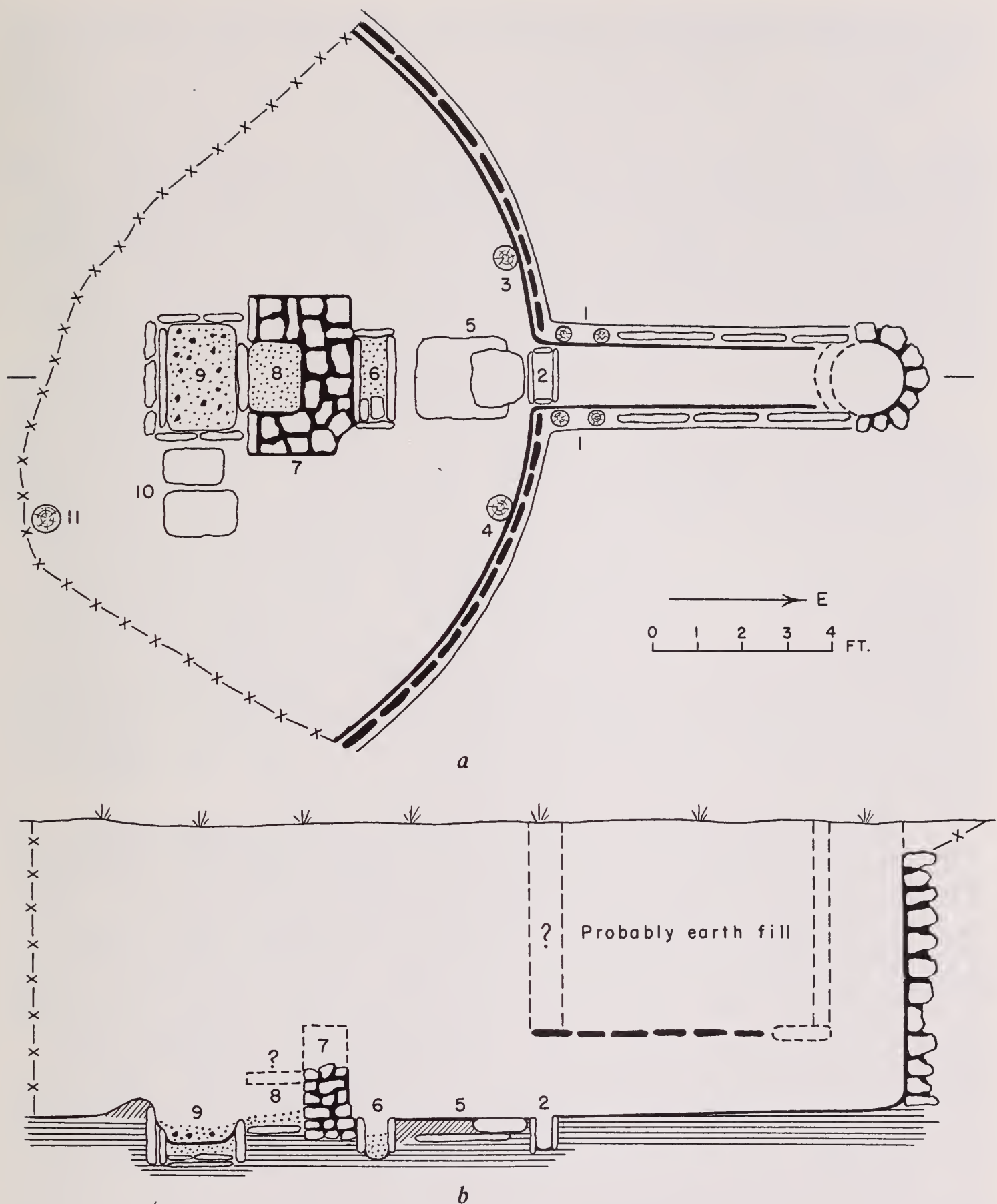


Fig. 48. Kiva 8: 1, 1, posts, with the slabs to their east, supporting the slat roofing of horizontal passage of ventilator; 2, water trap; 3, 4, posts probably helping unmasoned wall to carry weight of main east-west roof beams; 5, landing slabs; 6, ladder pit; 8, ash repository; 9, fire-pit; 10, grinding slabs; 11, posthole (see Fig. 42b).

material so perishable that no identifiable trace was left. The slats, on the other hand, although thinned by decay, were still relatively well preserved.

The passage was walled with large sandstone slabs, three on each side. At the west, or in-kiva end were 4-inch wooden posts, a pair on either side (1, 1, Fig. 48). Like the slabs, these had borne slats. Only the casts of the posts remained; from impressions of their bark, they appear to have been pinyon. A thin, well-smoothed layer of black clay, laid directly on the native red clay, formed the floor of the passage, at whose mouth was a rectangular slab-walled rainwater trap (2). As to the nature of the narrow vertical strip of kiva wall above the 1 foot, 9-inch high by 1 foot, 3-inch wide ventilator orifice, we found no clue. There was not enough fallen stone to indicate that it had been of masonry.

The chamber, some 20 feet in diameter, had been dug into the tough red clay of the slope and the unwallled hole was lined with thin cedar slats, much rotted, but apparently once set close together. They had been faced with light brown adobe that had borne multiple coats of white lime plaster. The working of the slats, none of which had remained exactly vertical, had caused this finish to flake off; it formed a little talus against what was left--mostly casts--of their lower ends. About 2 feet from either edge of the ventilator orifice a 6-inch pine post of unknown length had been set close against the wall (3, 4), presumably to help support the ends of two main east-west roof timbers which, having had to bear the weight of a hatchway coaming and a ladder, might otherwise have tended to crush down the unmasoned wall of the kiva. A larger post (11) may have been an added support for the southern main beam. Its position shows that it was not one of a four-post arrangement.

The floor-features were closely similar to those of all circular Pecos kivas of Glaze IV and later phases: landing slabs (5) set horizontally in the floor just east of the ventilator orifice; a ladder pit (6) east of the three-sided, badly broken-down masonry deflector (7); an ash repository (8) between the arms of the deflector, perhaps sheltered by a slab (shown in broken line and with a question mark in Fig. 48b); a slab-lined firepit (9); and, south of the firepit, two slabs showing evidence of having been used for grinding (10). Departures from convention were: ash in, but no burning of the ladder pit east of the deflector, which was normally found clean; ash repository (8) much shallower than usual; re-flooring of the firepit (9), the upper part containing much charcoal.

The floor, black like that of the ventilator, had not been renewed; no loom-loop holders were found, although we examined the areas north, south, and west of the deflector, in which rows of these accessories usually occurred.

As the ground hereabouts sloped rather gently downward to the south and the longest dimension of Kiva 8, in the line of its 9-foot ventilating apparatus, was east-west, the chamber could be sunk as far as was desired without the deep digging on the uphill side that would, for instance, have been necessary to get Kiva 6 completely underground. I think, in-

deed, that it was almost entirely subsurface, although its southern or downhill wall may have been allowed to protrude slightly in order that the northern or uphill edge of the roof should be a little above the level of the slope.

In the present case there was no doubt as to the period either of construction or abandonment. Both took place during Glaze IV. The seldom more than a couple of feet of midden hereabouts held almost nothing but Glaze II sherds, with a surface sprinkling of IV and V. There was no III at all. Glaze IV sherds were in the earth that had been filled in about the horizontal passage of the ventilator. And the lower part of the fill was almost entirely IV with a scattering of earlier Glazes. Above this were rocks, topped by sand laid down in standing water.

Kiva 2 was located on the East Terrace, north of Kiva 1 (Figs. 20, 21). Only a small part of the northeast arc was excavated, but enough was done to learn the nature of its wall and to estimate its diameter at about 22 feet. Graves found above and below its floor, showed that it had been built after Glaze I and that it had been abandoned and had become filled to the level of the terrace by late Glaze IV.

A Glaze I burial (Skel. 285, ad. m.) lay on virgin red subsoil one foot below the kiva floor, at a total depth of 12 feet. The kiva probably measured not more than 8 feet from floor to top of roof. If, as I think possible, it was built in Glaze III time, the terrace should by then have attained sufficient depth to allow the kiva to have been almost entirely subsurface. If not, its downhill (east) side may have stood clear a few feet; this, as we have seen, was doubtless necessary in the case of Kiva 6.

In the small section excavated, the fill above the floor contained, from below upward, building stone and adobe fallen from the upper part of the wall; then finely banded sand deposited in standing water; then "lean" rubbish, the latest sherds in which were Glaze IV; then a thin stratum of sand and, finally, some 4 feet of "rich" rubbish, full of animal bones, ash, charcoal, and Glaze IV sherds. Two skeletons (260, ad. m., late Glaze IV; 253, ad. f., Glaze V) lay in graves not over 3 feet deep in the upper "rich" rubbish.

The masonry wall of this kiva had been lined, presumably for its entire extent, with wooden slats set close against, but apparently not quite touching, the stones. They were almost completely rotted away, but very clear casts showed them to have measured from 2 to 4 inches wide, mostly 3 inches, by about 1 inch thick; they were set 1/4-1/2-inch apart. Their lower ends extended some 6 inches through the adobe floor, which held them firmly against the wall. Of the adobe finished with plaster that probably originally coated this wooden veneer, nothing remained.

Kiva 17 (location, Fig. 21) was exposed by a pit, 8 feet east-west, by 5 feet north-south, which was sunk to sample the deposit east of the Quadrangle's southwest extension. We merely examined its fill, the small part of the floor exposed in our pit, and noted the remains of its roof. Under a surface layer of sterile post-abandonment adobe washed

from the adjacent buildings, came heavily ash-streaked Glaze V debris. At 4 feet down began Glaze IV rubbish, which ran to the floor, at a depth of 10 feet 2 inches at the west, 8 feet 6 inches at the east. As the floor was level, the difference between these measurements was due to the rise of the surface of the ground toward the southwest extension. Near the middle of our pit at a depth of 4 feet 6 inches, was Skeleton 1516 (ad. m., no furniture). It was undoubtedly a Glaze V interment, as the grave shaft could be traced upward through the ash streaks of that period.

The floor, undoubtedly that of a kiva, was a 1/2-inch layer of brown adobe with ten or more very thin greenish plasterings, laid directly on hard, granular red clay subsoil. From it protruded the stub of a vertical post 10 inches in diameter, presumably one of four roof supports. The main roof beams had, as usual, disappeared. These laboriously cut timbers were always salvaged when possible. But their covering often remained. In this case it was of cedar slats, much rotted, that had carried a 4-inch layer of adobe. From the angle at which these lay, and the location of the vertical post, we figured our pit to be in the northwest quadrant of the kiva. Much fallen stone lay on the floor under what was left of the roof; it had probably been brought down from the upper parts of the wall when the main beams were pulled.

As to the period of its building we have no data, but there is no question that, like so many others, Kiva 17 was abandoned during Glaze IV.

Kiva 9 (location, Fig. 21) lay a little farther north, up the same slope in which the Glaze IV Kiva 8 had been dug. As in the latter case, there was no surface indication. An exploratory trench revealed the upper end of the circular, vertical masonry shaft of its ventilator. No further excavation was done. If this kiva was of the same size as Kiva 8, its south wall would have been less than 10 feet from it. Although no chronological data were obtained, its close proximity to the foregoing suggests that the two were contemporaneous.

Kiva 15 (location, Fig. 21) lay south of the south side of the Quadrangle. Only enough work was done to determine that it had a masonry wall, and that its upper fill, containing at a depth of 3 feet 6 inches the burial of a young baby (Skel. 1831), was Glaze V. The lower fill was probably Glaze IV, although I cannot find this recorded in the notes. The floor was apparently not reached by us.

Kiva 4 was the only circular kiva found by us at Pecos that had been built wholly above ground (Figs. 41c, 49, 50, 57d). It lay in the northwest corner of the North Terrace close within the defense wall and some 100 feet north of the Quadrangle. There were no surface indications of its presence. We came into it in 1916 through its northeast wall while following what was left of the foundations of the old Black-on-white building that had once occupied the North Terrace (Figs. 20, 21). Our first intimation that we were in a kiva was the finding of its firepit. Encountering this, we checked back along the sides of our shallow trench, and discovered where we had unwittingly breached the single basal course of stones that alone remained of the wall in that quarter. Following this in

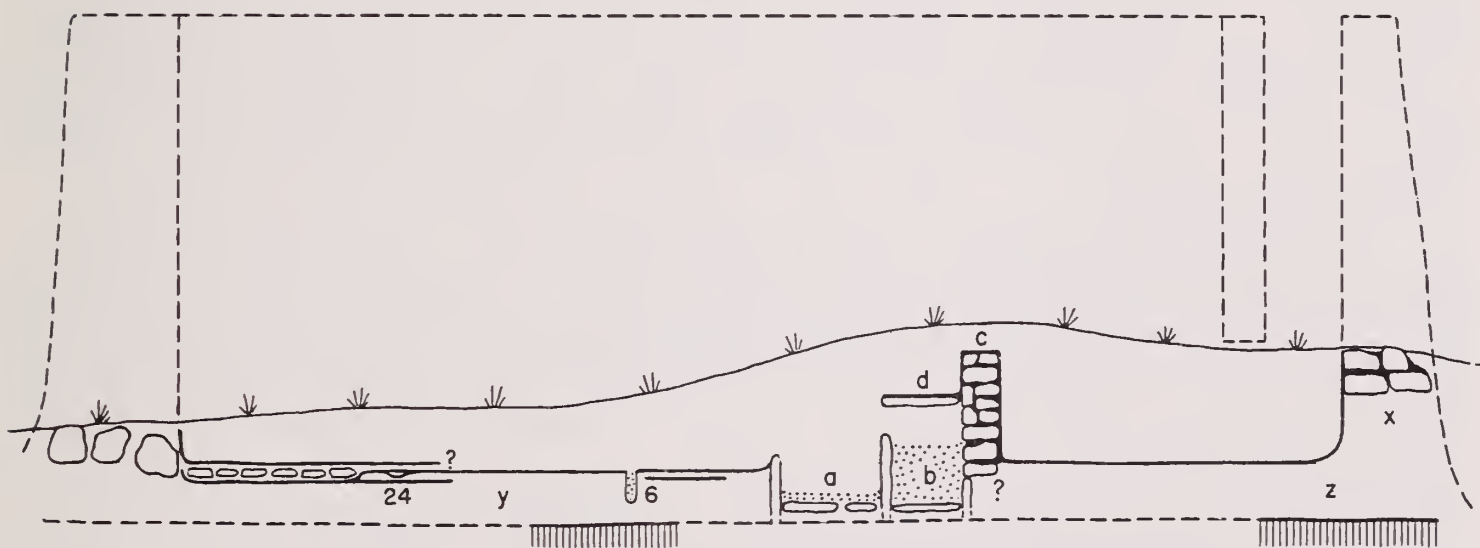
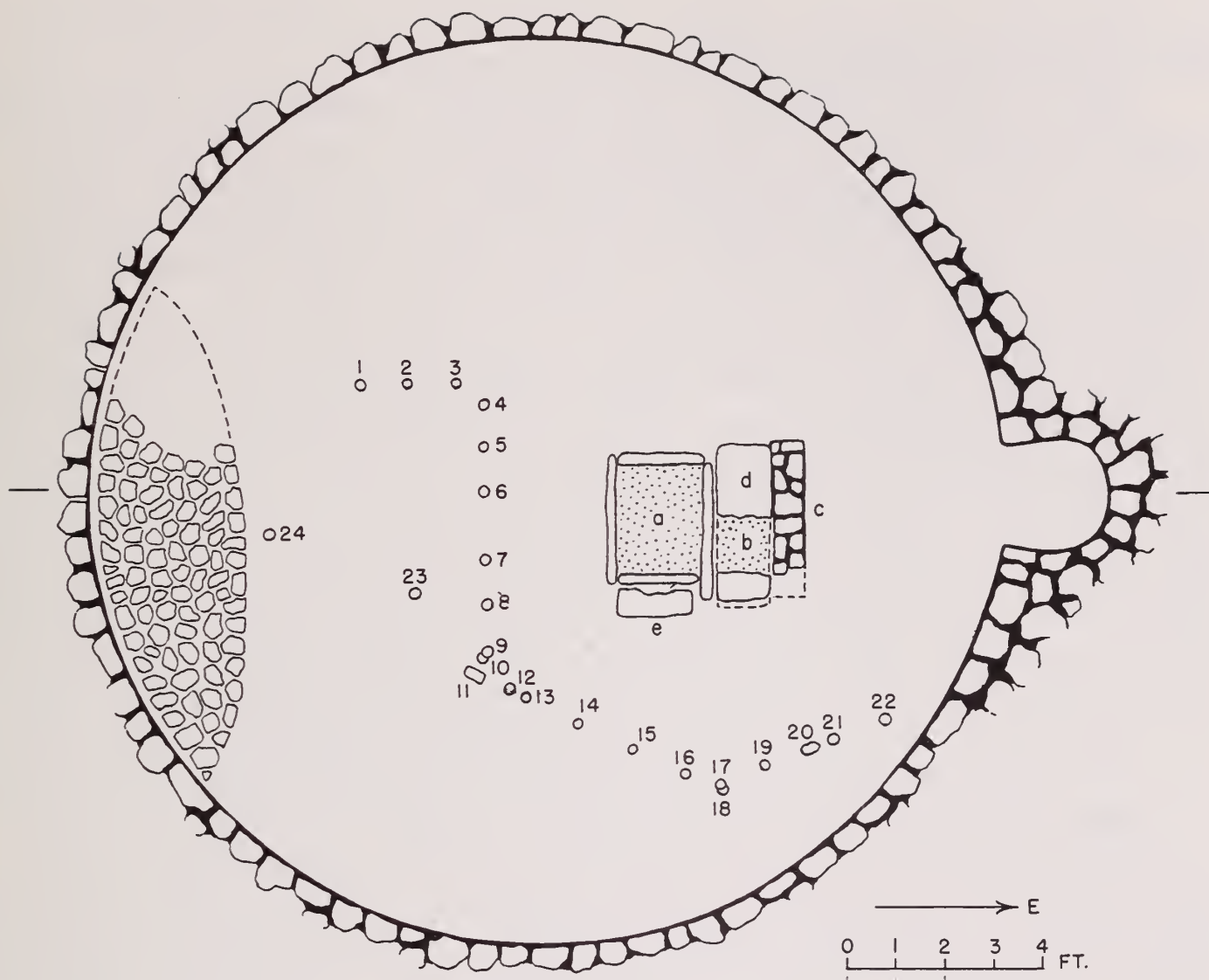


Fig. 49. Kiva 4: a, firepit; b, ash repository; c, deflector; d, slab above b; e, grinding slab; x, Biscuit A sherd; y, z, Black-on-white refuse below floor. Nos. 1-22 incl., loom-loop holders; 23, hole, purpose unknown; 24, shallow sipapu? (Figs. 41c; 57d).

both directions from the break, we ran out the inner circumference of the chamber and then proceeded to clean the floor.

Kiva 4 was the first to be given thorough examination. At the time I knew nothing about local kiva construction or where to look for the various features I subsequently learned to be typical of Pecos kivas. My work was therefore bungling and I think I may well have missed a ladder pit. Unacquainted, for example, with the three-sided type of deflector, I pulled away what may have been left of its south side, thinking it merely a piece of fallen masonry. I also failed to go below the bottom of the firepit, where, as was subsequently learned, there might have been remains of earlier ones. But the digging of kivas in the San Juan country had taught me that the floors of such chambers are not only often hard to follow, but that they yield important evidence regarding interior arrangements, easily missed unless excavation is most carefully done. For this reason the floor was first located by means of a small test-pit, after which the men were instructed to go no deeper than 8 to 10 inches above that level. The whole area about the firepit was spared from pick-and-shovel work, the resultant block of fill and the whole floor being later cleared with trowel, knife, and whisk-broom (Fig. 50a).

Kiva 4 proved to be an almost perfect circle, varying nowhere more than two inches from an average diameter of 18 feet, 8 inches.

The encircling wall was founded on a 9- to 10-inch skim of pure Black-on-white refuse that overlay bedrock. It was of unshaped chunks of sandstone. Only in the northeast quadrant did it stand as much as 1 foot 9 inches high, the top everywhere just under the grass-roots. On the east was the ventilator opening, an interruption in the wall 2 feet, 1 inch wide, opening into a rounded space 2 feet 5 inches north-south by 2 feet 2 inches east-west. The lower 1 foot 3 inches of this was cut into hard, rubbishy earth (Figs. 49, 41c), the upper part was lined with stones. The former height of the opening from the kiva into the ventilator could not be ascertained.

Opposite the ventilator, against the west wall, was an area paved with small flat stones set in red clay--waterworn pieces from the arroyo, bits of sandstone slabs, broken manos, a fragment of a cooking slab, and several pieces of burned sandstone, apparently reused firepit lining (Fig. 50b). As found, this construction was not symmetrical, but floor-markings indicated that one end had been removed in ancient times and that originally it had been of pointed oval shape, about 10 feet long by 3 feet wide.

The pavement was covered by the latest floor, which was of red clay 1 1/2 inch thick. The clay, when brushed, scaled off in horizontal flakes, as if it had been applied in thin layers. Its upper surface bore 6 or 8 coats of greenish-yellow plaster. Floor and plaster turned up to the wall in a nicely rounded "hospital" junction. The earlier floor, directly below, was smooth and black. It was in much better condition, but seemed to have been resurfaced several times. The pavement appeared to have been laid on the first of these surfaces, the later ones bringing the general level of the black floor flush with its top.

Just east of the east edge of the pavement, and approximately on the median east-west line of the kiva, there appeared in the dark lower floor a circle of lighter colored adobe (24, Fig. 49) which proved to fill a neatly-made depression 1 inch deep at the centre, and 3 inches in diameter. This may have been an unusually shallow sipapu.

The floors toward the centre of the kiva had disintegrated. One could not, therefore, be certain to which of the several levels to assign the many little ash-filled holes that were found between pavement and firepit and between firepit and south wall. The great majority of these were round, 3-3 3/4 inches in diameter, and 6-10 inches deep. They were packed solidly with very hard white wood ash, evidently stuffed in wet, and pounded down. The ash plug in each example that was sufficiently well preserved for examination showed two 1/2-inch round holes in its upper surface, as did those in Kiva 5. These holes were casts of a twig, probably a pliable willow switch, that had been tied on itself into a long, narrow loop and set in the excavation in the kiva floor, where it was held firmly in place when the ash paste solidified. We dug out several of the ash plugs, sectioned them lengthwise, disclosing clear impressions of the twigs and knots (Fig. 50d). The top of the loop protruded about 1 inch, as shown by an example in Kiva 16 with twig preserved.

When the positions of the 23 of these ash-filled holes that occurred in Kiva 4 were plotted, it became clear that they had been set in rows about 5 feet long, individual holes in each row being more or less evenly spaced, 11-15 inches apart. The paired twig holes were usually in the line of the row. One row of 6 holes (Fig. 49, 4-9 inclusive) lay 2 feet 4 inches west of the firepit, running north-south; two others were south of the firepit; one (Fig. 49; 13, 14, 15, 16, 18) running northwest-southeast; the other (Fig. 49; 17, 19, 21, 22) a little north of east. There had evidently been a fourth row, north of the firepit (1-3); careful search failed to locate other holes in this series.

Because of the bad preservation of the floors it was uncertain how many looms had been in use at any one time. There was, however, good evidence, as where Hole 17 lay above and had cut into Hole 18 (Fig. 50e), that all the series were not contemporaneous; and certain odd holes (11, 12, 20, 23) can only be accounted for by supposing that during remodelings of the floor older sets of loops had been almost completely removed.

There was a firepit (a, Fig. 49), ash repository (b), and a three-sided masonry deflector (c). The firepit was rectangular, 2 feet 4 inches north-south, and 1 foot 8 inches east-west, paved and edged with sandstone slabs. The edging slabs on the north, west, and south sides rose 2-3 inches above the lowest floor. The long east slab stood some 6 inches higher, serving to separate the firepit from the ash repository, which was of the same length and depth but was only 1 foot 4 inches wide. The repository had been enclosed on three sides: on the north and south by the low wing walls, on the east by the higher part of the deflector. Above the ash repository, there had been a large slab (d), which rested on the two wing walls. Only its north half remained. The other half had

Fig. 50. Kiva 4: a, note shallowness of deposit. In front of workmen, cleaning floor with trowel and whisk-broom, is block of earth over fire-pit and deflector, left for working out by staff; b, pavement on west side of kiva floor; c, part (Fig. 49) of alignment of loom-loop holders 17, 19, 20, 21; 20 belonged to earlier alignment, its top being lower than rest; d, holder 17 sectioned to show cast of looped twig; e, holder 17 cut into 18, latter is end holder of older alignment 13, 14, 15, 16, 18.



a



b



c



d



e

either been removed in ancient times or, more likely, had been broken into several pieces which we threw out, unaware of their significance. We probably also tore away the upper part of the south wing-wall, for, as already stated, I had not previously encountered a structure of this sort and was not on the lookout for anything more than a simple deflector. Furthermore, the whole contrivance had been more or less wrecked, presumably in the pulling off of the roof; nor did there remain any trace of the adobe with which it had doubtless originally been coated and which, in better preserved deflectors found later, enabled us to distinguish them from parts of fallen walls.

Just south of the firebox there was set, with its upper surface $3/4$ -inch above one of the lower floors, a slab (e) of fine-grained, dark, igneous rock, 18 inches long, $6\ 3/4$ inches wide, 3 inches thick. Its edges were unworked, but its top was smoothed, almost polished, as if by long wear.

The firebox was identified as such because of the severe burning of its edging slabs. Most of the ashes had been removed before abandonment, but a little was left in the corners and a $1/2$ -inch layer covered the paving slabs.

That the bin east of the firebox had been a repository for ashes, rather than a hearth, was indicated by the lack of burning of its walls or of the under side of the slab (d) above it. It was full of fine white ash, between which and the slab was 6 inches of horizontally bedded, sandy earth, evidently washed in. Lying partly in this earth and partly in the ash was half a small bowl of plain redware, the broken edge worked down as if to fit it for a scoop (Fig. 41c). In the ash was a red "soup plate" (Kidder and Shepard 1936: Fig. 249b), a large black sherd, part of a small Modern Painted bowl, and a pipe with "lightning arrows" carved in relief (Kidder 1932: Fig. 143b).

Kiva 4 was probably built and was certainly in use during Glaze IV, because only Glaze IV sherds were found between the lower and upper floors. That it post-dated the Black-on-white phase was indicated by the fact that Black-on-white rubbish lay below the floor at y (Fig. 49) and under the ventilator z. Positive proof, however, came with the discovery of a Biscuit A sherd in the earth below the east wall of the ventilator at x. The chamber, accordingly, could not have been constructed prior to Glaze I. It remained in service until relatively late times, witness the Modern Painted bowl in the ash repository, but because many Glaze V sherds occurred in the fill above the upper floor, it seems likely that abandonment could not have taken place until after the end of Glaze V, when Modern Painted pottery was only just making its appearance. Evidence that the kiva was given up a considerable time before the Pecos left the Pueblo is furnished by the industrious stone-robbing that had removed all but the very lowest parts of its walls.

Neither notes nor field plan indicate presence of ladder pit or landing slabs.

Kiva 13 (location, Fig. 21) was found in 1925 during testing and

trenching south of the Quadrangle. As soon as a pit dug to the floor on what proved to be its north side showed it to be a kiva, it was refilled.

It had apparently not been entirely subsurface, as the floor, directly on bedrock, was only about 7 feet down. The masonry wall was lined with cedar slats, which bore 2 inches of plaster in many fine layers. This was the only case in which plaster over slats was well preserved.

There are no data as to the period of this kiva's construction, but the fill contained Glaze V sherds clear to the floor. It was given up, however, before the final abandonment of Pecos, for after it had been filled the whole area in which it lay had served as a corral.

Kiva 1 (Fig. 51) was found in 1915 at the head of Trench A, the southernmost of three narrow, parallel reconnaissance salients that were driven up from the face of the single broad excavation we had been making in the great east midden (Fig. 20). This vast accumulation of refuse had proved so crowded with burials and had yielded so much stratigraphic information that it had occupied us during almost the whole of that season, our first at Pecos. The salients were designed to determine the midden's then unknown depth and westward extent. It proved to be far larger and deeper than we had foreseen (Kidder 1924: Fig. 1).

The kiva, encountered late that summer, was very badly handled, for although a circular depression in the surface of the East Terrace hinted at the presence of such a chamber, I cut through its eastern wall without recognizing it. Only when the firepit appeared in the side of the trench did I realize that I was in a kiva. The trouble was that until then the Pecos digging had been almost entirely in refuse deposits and I had not yet examined Kiva 4. My few earlier excavations had been in the well-built structures of the San Juan and the Pajarito Plateau, and I had no conception of how wretched late-period Pecos masonry could be, particularly on the outer side of a subsurface kiva's wall. As a matter of fact, all the upper part of the wall at that point had slumped inward and the men were working through what I took to be a mere pile of fallen building stone.

When the south side of the firepit was reached and I saw what I had done, I continued the narrow trench as far as the chamber's back (west) wall, finding the kiva to be about 22 feet in diameter. I postponed further clearing until the following year. That, too, was a mistake, for during the winter, rain and frost brought down the vertical sides of the trench and both deflector and ventilator were greatly damaged. Finally, the to-scale plan and section, which I suppose I made, have not come to light, so that Fig. 51, drawn from sketches in my notes, is only approximately correct. Excuses over, I may turn to description.

Kiva 1 had been constructed in a pit sunk into the heavy refuse deposits of the East Terrace. As its floor was nearly 8 feet below the original surface of the Terrace, the kiva was probably almost entirely below ground.

All around the interior base of the wall were heaps of building stones and above them, dipping toward the center of the kiva, were slabs of pine

bark with rotted slats and brush, obviously roofing material. Lying on this, in the eastern sector, was a single large, thin sandstone slab with worked edges that may have been a hatchway cover. As there was no trace of the heavy main beams that must have supported the roof, it was evident that they had been pulled, probably by Whites, after the pueblo was abandoned. The resultant wrenching had brought down the upper parts of the wall, the bark and brush falling on the stone wreckage. The deep conical hollow that remained had then become filled with sandy adobe washed from the mass of house ruins that rose just behind. It showed the fine banding, horizontal at the center, of silt laid down in standing water. These conditions and the entire absence of the refuse that was usually dumped into kivas abandoned while Pecos was still occupied, suggested that Kiva 1 had remained in use until the Indians left. That it had stood empty for some time before the roof was removed and the upper parts of the wall were brought down is indicated by the fact that clear to the floor no plaster was left.

Not yet having learned, as I did later, that the Pecos were forever working over their kivas, laying new floors, renovating firepits, and remodeling deflectors, I failed to take up what was presumably only the latest floor, probably missing sundry alterations. The drawing therefore shows only the chamber's ultimate arrangement. The ash repository (b in Fig. 51) was, as usual, walled in on three sides by the masonry deflector, c; its south wing had evidently been destroyed by my trench. A slab, d, that we may have found broken and pulled out, probably rested on the lower wings of the deflector to cover the ash repository. We also very likely did away with a landing slab and the smoothed stone that was almost always set in the floor just south of the firepit. The latter, a, was edged and floored with heavily burned sandstone slabs and was full of ash, which differed from that of most other kiva firepits examined at Pecos in that it contained much charcoal. In the ash of the repository was a small plain redware bowl like that in the ash repository of Kiva 4. Southwest of the firepit was a plain black culinary vessel, g. Its rim had been cut away before it had been set with its 12-inch orifice flush with the floor. Clean coarse sand filled its lowest third, dark earth above. Two round 9-inch holes, e, f, with traces on sides and bottom of rotten wood, had held vertical posts. It is very likely that two others (dotted circles, Fig. 51), completing a four-member set of roof supports, were overlooked, as well, perhaps, as a ladder pit.

Sets of hardened ash loom-loop holders were found, one--but this is mere recollection--on either side and a third west of the firepit. I have no record of the number of holders, or of their spacing. The photograph (Fig. 65e) of one that I took out shows clearly the marks of the digging stick used in making the hole into which the ash paste had been crammed.

The lack of dumped refuse suggested, as has been said, that Kiva 1 had remained in use until the end. Just when it was built is doubtful. Had I gone under the floor and also worked out the badly wrecked ventilator, sherds assignable to phase might have been found. It was certainly, how-

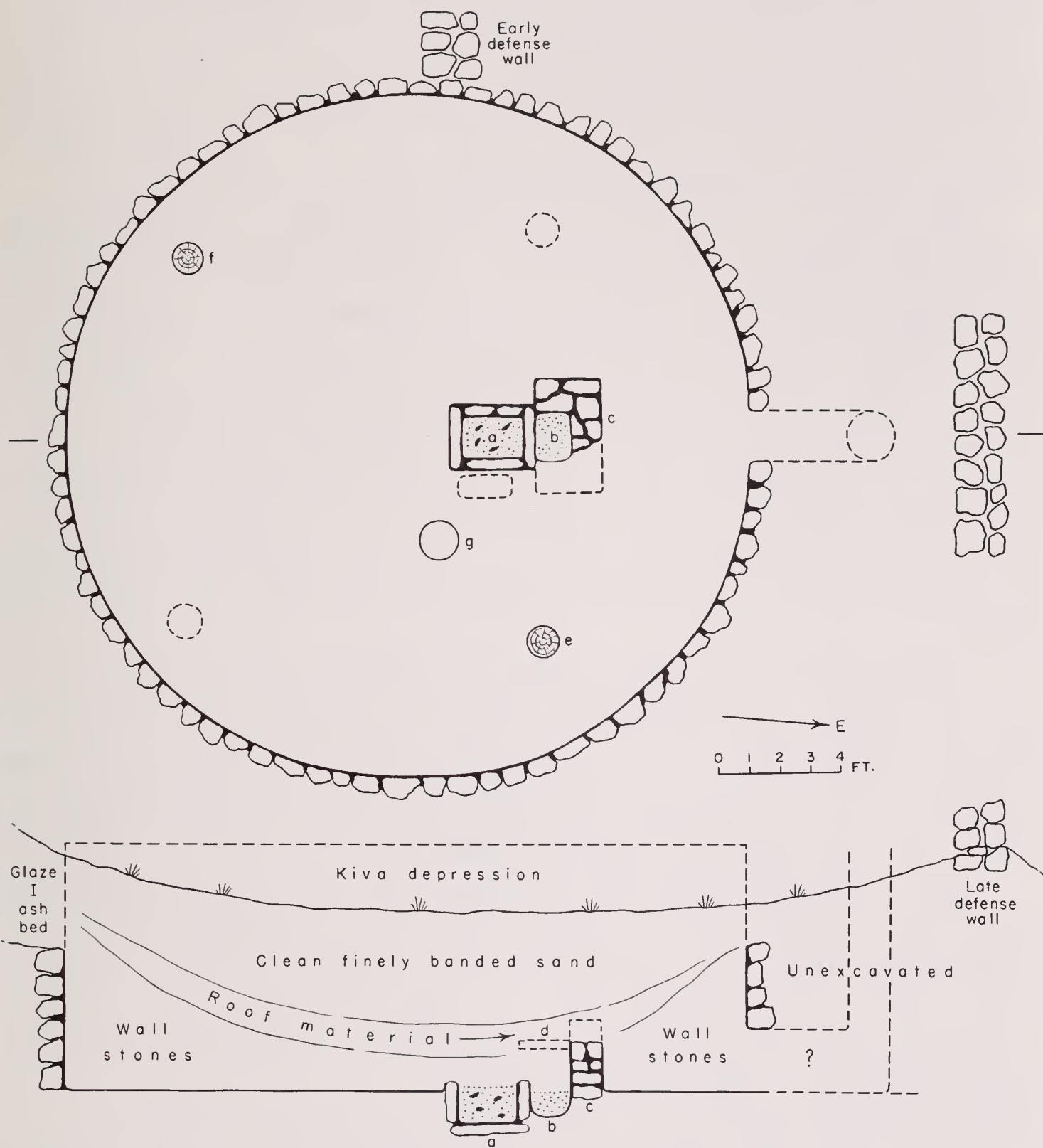


Fig. 51. Kiva 1. Original plan, section lost, so position and number of the many loom-loop holders not known: a, firepit, charcoal in ashes; b, ash repository; c, deflector; d, probable slab over b; e, f, postholes; g, coarse black jar sunk in floor. Early defense wall is undoubtedly also in unexcavated area south of kiva. Firepits long dimension should probably be north-south.

ever, a relatively late structure, as the East Terrace had taken final form with the most recent defense wall at its edge, before the kiva pit was dug. That wall was built during or after Glaze III. The kiva was sunk through an earlier, deeper-lying defense wall some 15 feet west of the later one; its base, which had been on the then edge of the terrace, was 5 feet below the present surface (Fig. 51). The kiva's pit had cut through a Black-on-white and Glaze I ash bed at the west.

Kiva 7 (Figs. 52-55) in the north end of the plaza, was numbered in 1920, but I only got around to digging in it in 1925, the last year of major excavations at Pecos. But when the top few feet of fill had been removed there began the series of deluges that played such hob with the work of that season. And by the time that other kivas, rooms, and trenches, the investigation of which was further along, had been drained or bailed or pumped out, dried and cleared of mud, it was too late to finish No. 7. I regretted this, as certain ash-filled pits found near it had led me to suspect that it might have been the kiva in which the storied undying fire had been maintained. It also had historic interest, being the "Aztec Church" illustrated by Emory (1848). The great log lying across it that is shown in Emory's picture and commented on by Bandelier was still in place (Fig. 32a). Nearly 26 inches through at the butt, it proved too rotten for tree ring dating.

When, many years later, I took up the writing of this report, I found myself itching to learn something of Kiva 7. And I had the good fortune, thanks to Boaz Long, Director of the Museum of New Mexico, to have its excavation done by Dr. Fred Wendorf of his staff, who completed in 1954 an admirably thorough study of this, in many ways the most interesting kiva so far opened at Pecos. The following description is from Wendorf's notes. The drawings and photographs are his.

Approximately circular, but slightly flattened on the east and southwest, Kiva 7 had a maximum diameter of 21 feet, 8 inches. It had evidently been almost entirely underground, probably protruding no more than a foot or two. In places, the wall still stands almost 8 feet above the lowest of the three floors. It is of irregular pieces of sandstone, averaging 15 inches long, 10 inches wide, and 5 inches thick, laid in abundant adobe mortar, uncoursed (Fig. 54b, c).

FIRST STATE. The circular pit was dug and lined with the above-described wall, which was given a thin coating of clay, only patches of which remained. The floor was of 6-8 inches of dark brown clay, laid directly on sandstone bedrock (6, Fig. 53). It was shallowly saucer-shaped, curving pronouncedly up to the wall; the surface was smoothly finished and, with what was left of the wall plaster, heavily burned. This first floor, as presumably also did the two later ones, doubtless ran the length of the horizontal passage of the ventilator, but the latter with its vertical flue was hopelessly crushed; Wendorf, however, records flakes of plaster in the fill, indicating that it had had at least one, more likely at least three finishing coats.

There had been a three-sided masonry deflector, unfortunately al-

most completely destroyed by a treasure-hunter's hole, no sign of which appeared when I saw Kiva 7 on my first visit to Pecos in 1910. It was still open but evidently partly filled in 1881, when Bandelier (p. 83) noted it to be only one meter deep. His "flat stones laid like a rough stone floor" were probably fallen wall stones. I found many in the upper earth in 1925.

Wendorf uncovered what was left of the deflector, namely the damaged south wing and part of the east side. The firepit, except for disturbed ash and some lining slabs, had entirely gone, as had the ash repository. A rectangular ladder pit just east of the deflector was, however, intact. It had undergone three alterations, probably corresponding to the kiva's three floors (Fig. 53a). That the deflector had existed from the beginning in approximately its final form was determined by Wendorf, who observed that its innermost layer of plaster, like the earliest coat on the kiva wall and the finish on the lowest floor, was thin and heavily burned. The two roof support posts (6, 6, Fig. 52a, b), whose rotted stubs protruded from the later floor (Figs. 54, 55) showed no signs of fire. They were evidently either later additions or replacements.

SECOND STATE. An elaborate renovation took place after the fire; as to how long after, evidence was lacking, all ash and refuse that might have contained sherds having carefully been removed.

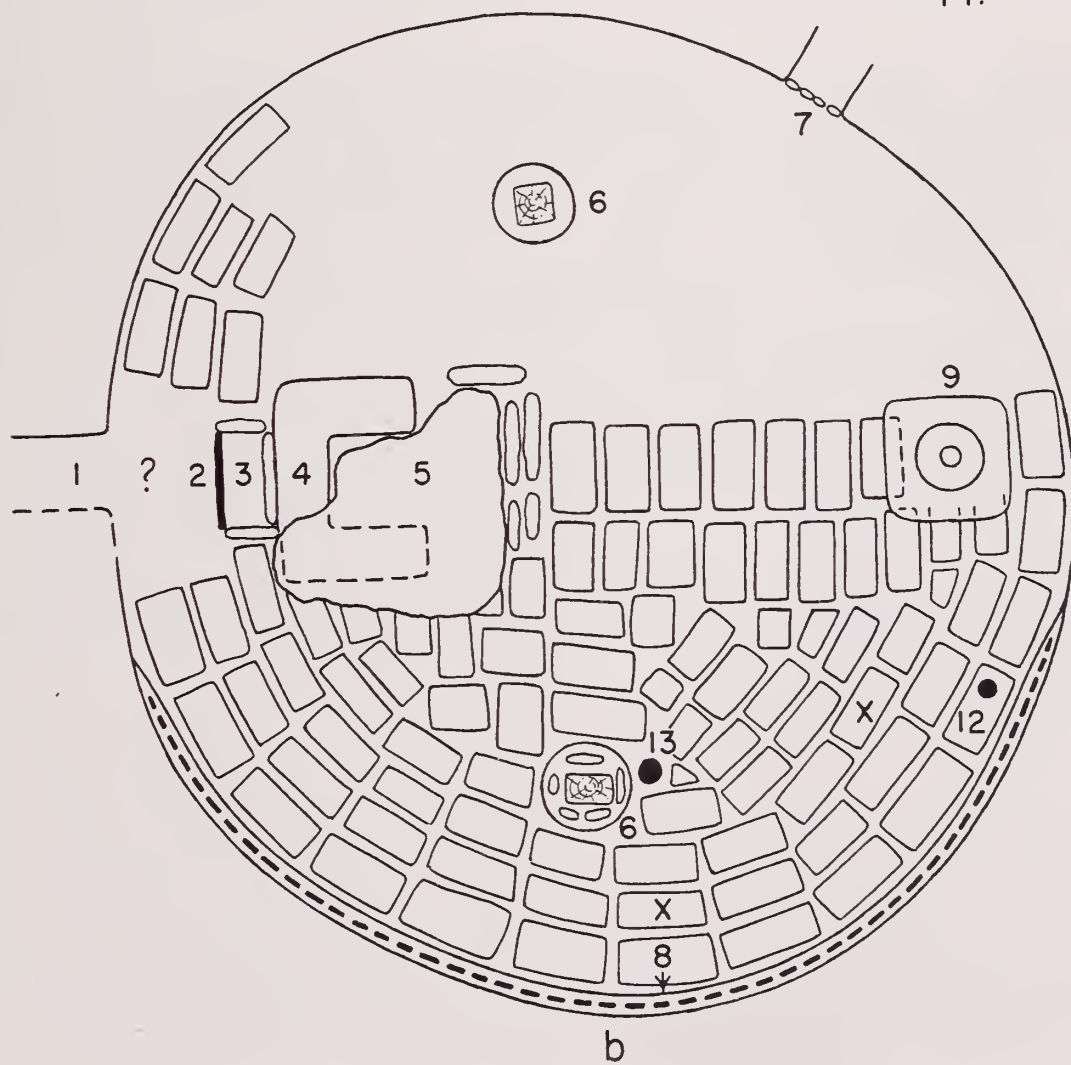
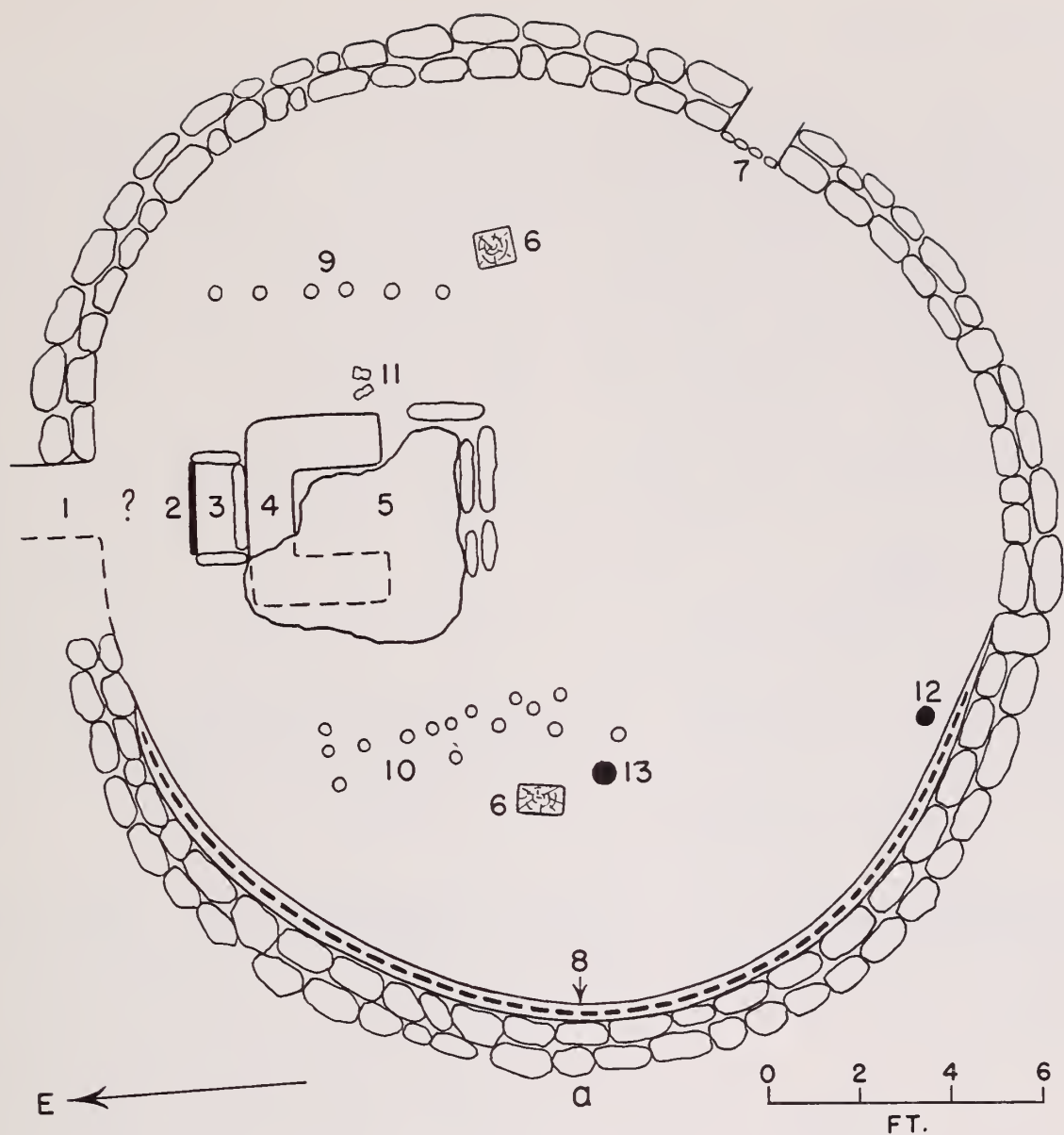
Just prior to the laying of the second floor a reinforcement was built on the north side nearly half way around the kiva (Figs. 52, 8; 55c). Wendorf believed, I think correctly, that this was intended to strengthen that part of the original wall against outward pressure caused by the great weight of the large buildings only about twelve feet distant to the north.

What might have been the method of erecting the reinforcement was to begin at one end and smear rust red clay in a plastic state onto a short length of wall, bedding into it, one after another before it dried, lath-like pieces of split cedar, setting each close to its predecessor and shoving them down through the first floor into the underlying clay (Fig. 53c, 7). He, or more likely she, for women had probably been drafted for this task, wedged thin sandstone spalls between lath and wall, at the same time covering the laths with more of the same rust-colored clay before moving along to do a new section. Clay of this type had been applied not only over the reinforcement, the rest of the kiva walls, and the deflector, but had also been spread 2 inches deep on the floor to help hold the lower ends of the "laths" firmly in place.

To return for a moment to the reinforcing wall, I imagine that a similar process was followed in furnishing Kivas 2, 8, and 13, Guard-house H, as well as parts of Kiva 11, with their lining of vertical wooden elements. In none of these, however, were stone spalls used.

Before the second, or middle, floor was laid, the bare first floor had been covered with 3-6 inches of clean sand, the differences in thickness being due to the fact that this floor was flat rather than, as was its predecessor, slightly concave. It therefore made a nearly right-angled junction with the wall (Fig. 53c, 4). The middle floor unlike any other

Fig. 52. Kiva 7: a, upper; b, middle floor. 1, crushed ventilator; 2, pole edging of west side of deflector pit (probably not present in middle floor; shown by mistake in b); 3, ladder pit (Fig. 53a); 4, deflector damaged by treasure-hunter's hole; 5, area of hole that destroyed fire-pit, ash repository and part of deflector; 6, posthole; 7, niche containing small ceremonial vessels; 8, reinforcing wall (Figs. 53c; 54e; 55c); 12, 13, small postholes, No. 12, shown in b, almost surely dug from upper floor. Reference numbers for a (upper floor) alone: 9, row of 6 loom-loop holders; 10, fifteen loom-loop holders (rows not discernible due to ancient disturbance); 11, pair of chipped grooved axes on floor. Reference number for b (lower floor); 9, sipapu. Rectangular adobes in b were sketched, not surveyed. They covered almost whole floor including southwestern area in which not drawn, but were not noted between pit east of deflector and ventilator. This and Fig. 53 from field drawings by Wendorf.



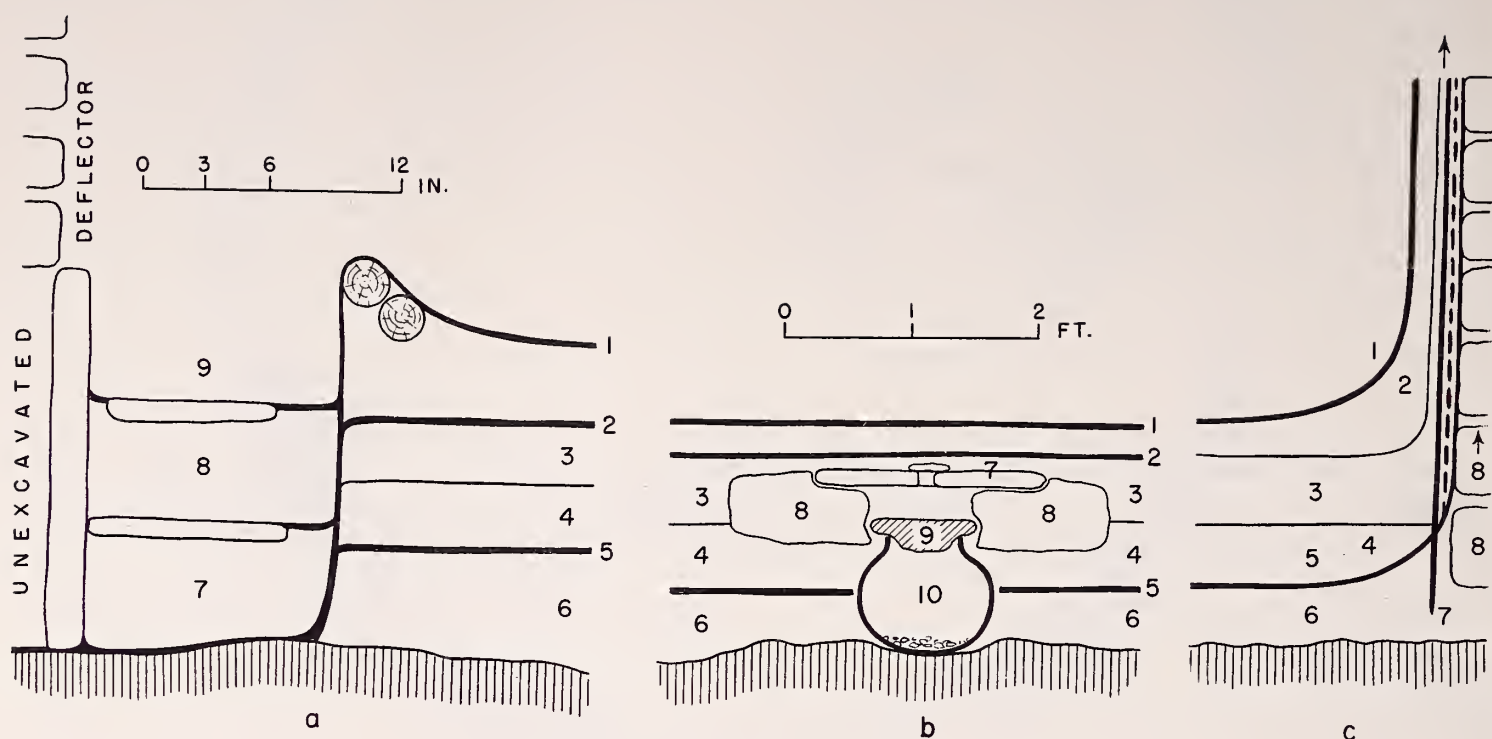


Fig. 53. Kiva 7, details: a, ladder pit east of deflector; 1, upper floor slanting up to edging of embedded poles; 2, surface of middle floor of adobes; 3, adobes of middle floor; 4, clean sand; 5, lowest floor, burned; 6, brown clay on bedrock; 7, 8, 9, successive fillings and floorings of pit. b, "Sipapu" (Fig. 55a, b); 1, upper floor, many layers of plaster; 2, level of middle floor of adobes (Figs. 54d, e; 55c); 3-6, same as in a; 7, perforated slab, hole covered by small round slab; 8, rectangular "cushion" of maroon clay; 9, mud seal of jar; 10, jar, offerings in bottom. c, section of north side of kiva; 1, 2, upper and middle floors, their finishing coats continued vertically up kiva wall; 3, adobes of middle floor, past outer edge of which cedar poles (7) were sunk and wedged into place with sandstone spalls (vertical black marks), to reinforce north wall of kiva. b, c, approximately same scale. See Figs. 52, 54, 55.

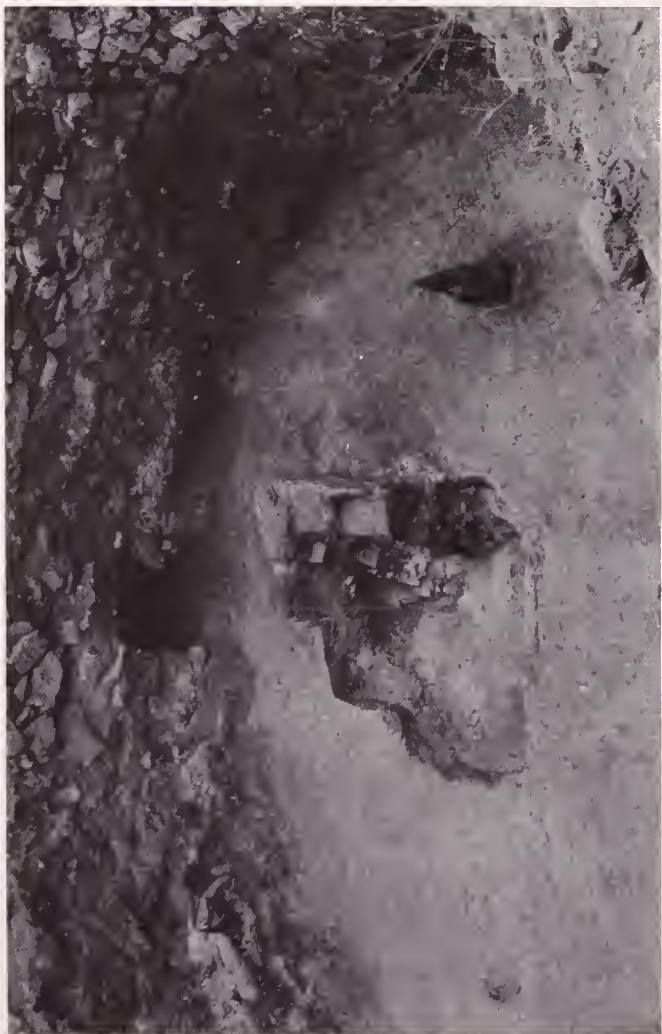
kiva floor found at Pecos, had been paved with adobes. These were laid in maroon-colored clay. As can be seen in the plan and photographs (Figs. 52**b**; 54**d**; 55**c**), the arrangement of the adobes was made evident by the maroon clay between them. The work had been wedged and tightened by an occasional small sandstone spall set vertically.

The adobes had almost all been rectangular; they averaged 20 inches long, by 9 wide, by 2 3/4 thick, with a few irregular edges or broken corners. Two (x, x, Fig. 52**b**) were of darker clay, containing charcoal; Wendorf thinks it likely that for some reason these had had to be replaced and that in molding new ones a different material was used.

The sipapu was found and cleared before the middle floor was recognized, but Wendorf feels sure that it dates from the middle period, having perhaps been installed and covered [for concealment? A. V. K.] during that floor's construction. Over it passed the rust-colored clay. The presence of the adobes not having yet been discovered, their exact relationship to the sipapu was not observed in the small excavation necessary to expose it. This surely ceremonial arrangement consisted of a Black-on-white jar (Fig. 65**a**), which had been sunk through both the clean sand between the first and second floors and the first floor itself (Fig. 53**b**). Its mouth was plugged with clay squeezed in and over the rim in a plastic state. Fitting about the neck of the jar was a sort of thick collar, square with rounded corners (8, 8, Fig. 53**b**). It was of the same maroon clay later found between the adobes of the middle floor. Set neatly into the top of the collar, apparently while it was being modeled, was a circular 18-inch sandstone disc with a 3/4-inch central perforation, drilled from both sides. This little hole was covered by a 3 3/4-inch disc of the same material 1/4-inch thick (Figs. 53**b**; 55**a**, **b**). Around the upper part of the collar was rust-colored clay. In the jar was a single Olivella bead, three shell disc beads, three pieces of Unio shell, a turquoise bead and six bits of broken ones, 55 pieces of raw or partially worked turquoise, and what seemed to be a fragmentary bone whistle.

Another find in this remarkable kiva was a sealed wall-niche (Figs. 52, 7; 55**e**) in the southwest quadrant that contained eight small pottery vessels, seven whole, one in fragments (Figs. 55**f**; 65**b**). It was not possible directly to connect the niche to one of the three floors because the plaster that had certainly once concealed its orifice and could have been followed down to a contact with one or another of them, had fallen away. There can be little question, however, that the linkage should be with the middle floor. For one thing, the small-stone masonry that closed the niche had been laid in the telltale maroon clay; also, the little pots were akin to those found elsewhere at Pecos in association with circular perforated slabs like that of the sipapu.

The niche (Figs. 54**b**; 55**f**) was 16 inches high, 12, wide, 18, deep. Its single sandstone floor slab was 8 inches above the level of the kiva's upper floor. Its back was not walled, so Wendorf dug for three feet past the kiva wall, finding that chamber to have been sunk into Black-on-white refuse. The 17 sherds collected were kindly typed by Stanley Stubbs as



a



b



c



d



e

Fig. 54. Kiva 7: a, lowermost floor; north and south roof supports, remains of deflector, orifice of crushed ventilator; looking east; b, lowermost floor, southern roof support, niche emptied; looking southwest; c, middle floor before cleaning: southern roof support, damaged deflector, crushed ventilator orifice; looking a little north of east; d, adobes of middle floor between southern roof support and south wall; e, middle floor, reinforcement of wall; small upright sticks near northern roof support placed to preserve location, for mapping, of loom-loop holders sunk from removed upper floor; looking north of west. Photos by Wendorf.

follows: Santa Fe, 6; Wiyo and Galisteo, 1 each; corrugated, 9. The deposit tapped must have been close to the bottom of the midden and the Black-on-white sherds, being all of varieties also present at Forked Lightning, indicate that it dates from an early, possibly the original settlement of the mesilla. This, of course, does not indicate the age of the kiva. I postpone consideration of the roof support posts and the interesting ladder pit just east of the deflector.

THIRD STATE. The latest treatment of the kiva wall was the application, through the succeeding years, of 50 or more very thin coats of gray plaster that also appeared on the deflector and the butts of the roof support posts. The floor, of dark brown clay, 2 inches thick, but heavier where it turned strongly up to the wall, was slightly concave. In fairly good condition, it was fortunately also damp when first cleared. This revealed, because they held the moisture longer and were therefore darker than the rest of the floor, the presence of loom-loop holders both north and south of the deflector (Figs. 52a; 54e). They were unlike any others found at Pecos, being of clay rather than ash, and in the form of balls 4 to 6 inches in diameter. In each was a pair of small vertical holes averaging 1 1/2 inches apart, which had held the looped twig. They had been sunk from the upper floor down through the middle floor. The southern set of six was a little over 5 feet long. The north set had been shifted several times, as Wendorf located fifteen units. Five of these differed from the others in that a small clay ball was inside a larger one of ash paste like that of the loom-loop holders in the other kivas.

The ladder pit immediately east of the deflector (3 in Fig. 52) differed, as did so many elements of Kiva 7, from others similarly located. It was about twice as broad and had twice been refloored after it was originally sunk to bedrock (Fig. 53a). Whether the three resulting states corresponded in time to the three floors could not be determined, but Wendorf thinks it probable.

The pit was, from the beginning, backed on the west by a wide slab set against the deflector. The bedrock from which it rose had been evened by a thin layer of a micaceous clay not found elsewhere. The east edge of this unique pit was raised well above the level of the latest floor and edged by two short lengths of a 3-inch pole (Fig. 53a). The lowest and second divisions of the pit (Fig. 53a, 7, 8), each covered by plaster and a slab, were full of earth and bits of plaster; unfortunately, there were no sherds. The open upper part of the pit, again without sherds, contained a few animal bones.

ROOFING. The presence of the large pine log (Fig. 32a) that lay across the kiva is hard to explain except as a former roof beam. But if so, it would have more than crossed the structure, whose maximum diameter was less than 22 feet, as its own length was 27 feet. Thus, both ends would have extended beyond the limits of the kiva. Its great strength would seem to have made supporting posts unnecessary. Yet it lay 20° west of magnetic north just about over the two posts, which from their size and careful setting look to have been designed to sustain a heavy load.

Although their upper parts had rotted away, their butts were well enough preserved to be measured and photographed (Figs. 54a-d; 55d). Well shaped to rectangular form, they were, at floor level, close to 12 inches east-west by 9 north-south. As has been said, they showed no sign of fire, the effects of which were seen on the innermost coat of the wall plaster and the surface of the first floor. Possibly, they replaced burned posts that had been footed at the same places in the first floor. In any case, this was done when the middle floor was laid, for its adobes had been set about them (Fig. 52b) and both had been packed into their post-holes with the maroon clay so characteristic of that floor. The northern post had been further stabilized by forcing rocks down into the clay around it.

Two other postholes were found. Wendorf is sure that the one against the west wall (12 in Fig. 52; cylindrical, diameter, 4 inches, depth 5) was dug from the upper floor because it passed through one of the adobes. The other (13 in Fig. 52; diameter 6 inches, depth 10) was close against the large north posthole and might have held a wedge or a supplementary post. Because its age is problematical, it is shown in both plans.

On the latest floor, between the stubs of the two main posts, Wendorf noted rotted remains of a beam about 5 inches through. He considered this to represent the major roof beam. However, if one believes the long log that lay on the surface to have served that purpose, one could think the 5-inch timber to have been a shorter parallel beam that had fallen backward or forward. In either event, the method of completing the roof was clear, for Wendorf found over and at right angles to the rotten timber, traces of plank-like split cedar and long 4-inch strips of pine bark. Above them was the usual heavy adobe layer, here averaging 12 inches thick. On and around these remains were most of the sherds and the few other specimens recovered. From that level to the surface the fill was, as I had also found it, sterile, washed and wind-deposited sandy adobe with building stones that had fallen from the wall as the kiva filled.

AGE OF KIVA 7. Among the sherds were a number of Modern Painted pieces from bowls and jars, one from a high-necked red jar (see Kidder and Amsden 1931:frontispiece), one from a Tzia Polychrome bowl (Kidder and Shepard 1936:377), fragments of vessels of Glazes V and VI, and several sherds of a small bowl of thin black micaceous ware of a sort not found before at Pecos. It resembles the micaceous cooking pottery made in recent years at Picuris. There was also a bone tube, part of a bone flageolet (Kidder 1932:249), an obsidian and a flint arrow point, and a cupped stone. There were bones of deer, bison, and turkey, and the skull of a dog or coyote.

Kiva 7 was probably in use until the abandonment of Pecos, for there seems no reason for disbelief that its hearth held the undying fire seen by Gregg (1845). I have wondered, indeed, if local legend to that effect might not have led to tales of buried treasure and the digging of the pit that destroyed the fireplaces and so much of the deflector. No such hole

Fig. 55. Kiva 7, details: a, sipapu, perforated cover in place; b, cover removed, rim of jar exposed (Fig. 53b); c, remains of plastered reinforcement of split cedar, adobes of middle floor being cleaned, looking northwest; d, southern roof support, lowermost floor exposed; e, sealed niche in southwest arc; f, miniature vessels in niche. For these and sipapu vessel, see Fig. 65a, b. Photos. by Wendorf.



a



b



c



d



e



f

was made in any other kiva, although the circular hollows of several others were equally obvious. As to when this chamber was first built, there lacks all evidence. The earliest floor had been carefully cleaned after the fire and the wreckage of the firepit and its surroundings did away with the possibility of reliable sherd superpositions there. Plaster layers common to both the original surface of the wall and to the deflector prove the latter to have been built during the kiva's first state. The absence of loom-loop holders from the first two floors is no help for dating, because although they have not been reported from Black-on-white or Glaze I kivas of the Upper Rio Grande, we do not know when they came into use at Pecos.

ADDENDUM. Further interesting finds were made in this very unusual kiva by Bruce T. Ellis in 1956 when he and Stanley Stubbs were studying the remains of the early Mission (Stubbs, Ellis, and Dittert, 1957). Ellis thought that there might be some connection between certain salvaged adobes that he and Stubbs had found piled in what had been the Sacristy of the early Mission and those that surfaced the middle floor of Kiva 7. The two lots proved to be identical, both in size and color (see Appendix III).

While examining that floor, Ellis noticed in the masonry of the kiva wall, newly exposed by the peeling of plaster, two apparent lintel stones. I quote from his letter of June 25:

"Both stones proved to be niche-lintels. I cleared both niches, and found each to contain a cache of stone artifacts, 28 in one and 43 in the other. They are to some degree similar to the cache of stones (including so-called 'kiva bells') which Fred Wendorf found in the Cuyamungue kiva in 1952. There is a complex of artifacts present, however. The stones range from thin, highly polished slabs, through celt-shaped and other indeterminate objects, to natural forms showing only use-marks. Material is varied: fine-grained basalt, fine and coarse sandstones, limestone, schist, etc. There are a few apparent 'kiva bells,' but other forms are in the majority. Sizes range from two to fourteen inches in length. Pestle forms are included, but show wear on the sides as well as the ends."

At my request, Ellis has agreed to describe in El Palacio the two niches and their contents. He also plans a comparative study of the Pecos stones and other similar objects, and he hopes to discuss the caches with native informants. It is accordingly only necessary here to note that Niche A was in the kiva's south wall, 7 feet 7 inches along the wall East of the niche in which Wendorf found the small pots (7 in Fig. 52; Fig. 55e, f. Niche B was in the north wall, across from A. A line stretched between the two would pass over the former position of the destroyed firepit. Its opening had been covered by the retaining wall (8 in Fig. 52). Fragments of the cached stones in B fitted pieces in A, indicating that the deposits, and possibly also the making of the niches, had been contemporaneous; both were certainly earlier than the retaining wall, i. e., either prior to, or at the same time as, the laying of the middle floor.

Ellis also noted in the south wall some 4 feet southeast of A, a flat

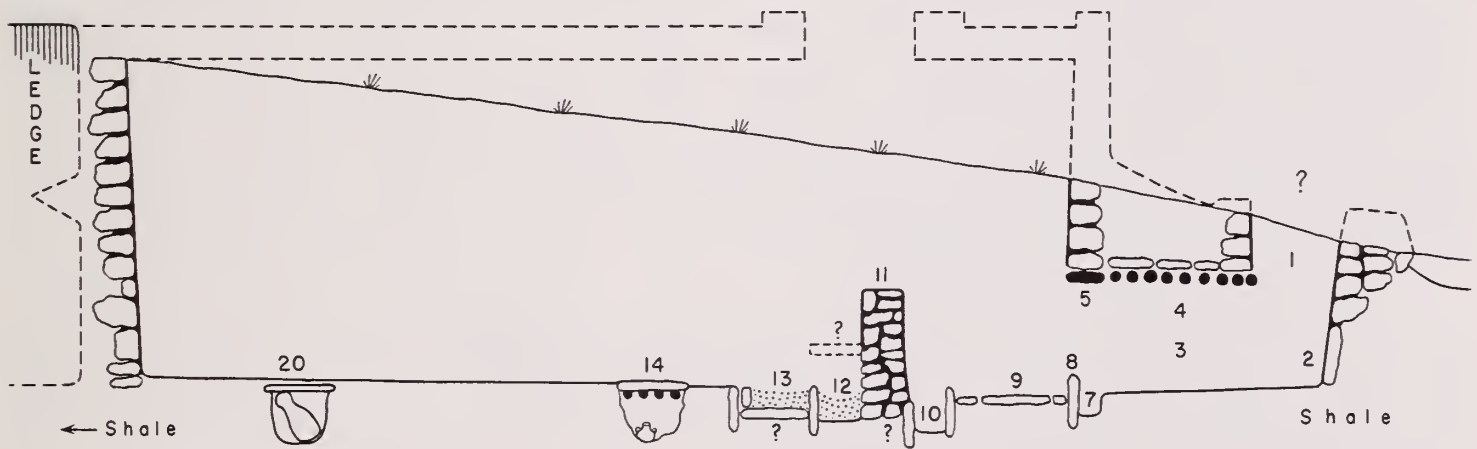
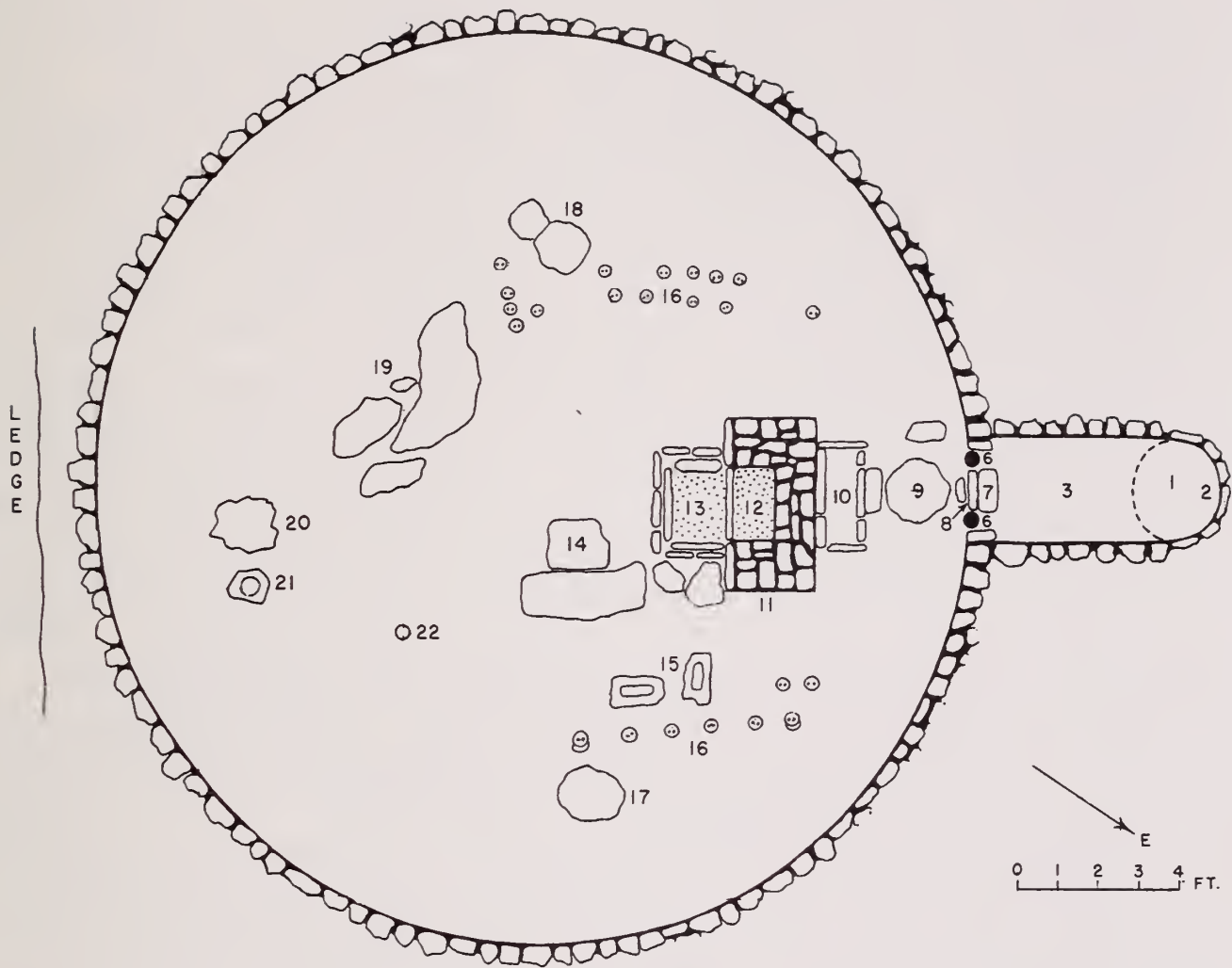
stone resembling the floor-slabs of the other two niches. As he lacked time that day to examine the find, this was done shortly after by Wendorf. It was indeed a niche, but contained no stones. Wendorf believes that it dates from the final occupation of Kiva 7. His description follows: "The new niche, 2.7 feet above the lowest floor, was 1 foot high, 1.1 wide, 1.4 deep. The floor was a roughly broken sandstone slab. The niche had been partially opened by Ellis, who tells me that there were no stones observable in the front of the fill. He observed that in the section he excavated the fill was a hard clay containing many blocks of laminated plaster. Our findings substantiated Ellis', with the additional note that the plaster was identical with that observed on the exterior of the deflector and on the exterior of the northern reinforcing wall. This plaster, consisting of scores of layers, had probably lined the entire niche, including the ceiling, but remained only on the walls, and a very thin layer on the floor. The irregular wads and lumps of plaster in the fill appeared to be from the ceiling. The back of the niche was plastered over a layer of maroon-brown micaceous clay (0.15 feet thick) laid against small upright vertical staves of split juniper about 1/4-inch thick and 3/4-inch wide. Behind the staves was a heavy brown clay which continued unbroken for 6 inches, at which point the excavation terminated." In a later letter, Wendorf adds, "My guess would be that the niche was constructed during 'middle floor' time, on basis of similarity of mason clays, and relined during 'upper floor' time. I doubt that it was sealed but I don't think we can be sure."

Kiva 16 (Figs. 56; 57b, c), the southernmost on the East Terrace, is some 70 feet north of the north end of the South Pueblo. Its excavation in 1929 was the last undertaking of Phillips Academy at Pecos. The work was under the direction of Charles A. Amsden of the Southwest Museum, who had with him the Laboratory of Anthropology's Rockefeller Fellows in Archaeology: Isabel Kelly, Frances E. Watkins, Eva Horner, the late Ssu-yung Liang (afterward of the Archaeological Survey of North China), Robert F. Greenlee, and W. B. Bowers. Dr. Paul H. Nesbitt was at Pecos for some weeks as a most helpful volunteer.

Kiva 16 was backed up almost against the upper sandstone ledge of the mesilla, at that point underlain by greenish gray shale. The chamber, 25 feet north-south by 24 east-west, had been sunk into the shale at the west a little over 8 feet, but as the surface of the terrace here sloped abruptly downward to the east, that side must have stood clear 4 feet or more (Fig. 56). Before excavation, a short arc of its west side could be made out on the surface.

The wall was as usual of crude uncoursed masonry. It had been laid no earlier than Glaze V, a sherd of that ware having been found deep in the mortar between the stones. The brown adobe finishing coat, apparently without lime plaster, only remained on small areas near the floor. This suggested that the wall had been exposed to the weather for some time, but the fill contained no laminated deposit of fine sand such as we often found in kivas and other depressions that had long continued to hold

Fig. 56. Kiva 16 (Fig. 57b, c), to the north of the South Pueblo: 1, 3, vertical and horizontal shafts of ventilator; 2, upright flat stones edging east end of horizontal shaft; 4, cedar poles roofing shaft and supporting flat stones; 5, wooden lintel of ventilator's in-kiva orifice fell before photo, fig. 57c, taken; 6, 6, posts supporting lintel; 7, 8, pit and slab water stop; 9, landing slabs; 10, ladder pit; 11, deflector; 12, ash repository; 13, firepit; 14, northern of two slabs covering repository for small vessel; 15, grinding slabs, set farther south of firepit than usual; 16, 16, loom-loop holders; 17, slab-covered repository, empty; 18, repository containing ceremonial (?) stones; 19, slabs set in floor, nothing found below; 20, sipapu or repository, held ceremonial cache; 21, slab in floor with mark of round wooden object, perhaps butt of vertical post; 22, small hole filled with ash.



rain water. Very few building stones appeared, nor was there much accumulation of the kind of household refuse that had usually been dumped into abandoned kivas. On the floor was clean adobe that might have been dug anywhere in the vicinity. However, at about the level of the top of the deflector was a little refuse with Glaze V, VI, and a few Modern Painted sherds, together with a bit of blue and white china. Thence to the surface was again clean adobe, but in it were many bison bones, most split for marrow, the hoof of a burro, and a human femur.

From these conditions and because of certain ceremonial objects found in floor repositories, Amsden and I felt that Kiva 16, probably built during Glaze V--as witness the sherd in masonry--had had to be given up, perhaps because of ecclesiastical pressure, either before 1680 or, more probably, soon after the reconquest. Glaze VI and modern sherds testify to the lateness of its abandonment. Whatever the cause, the kiva roof was removed. The absence of all main or secondary beams, cross rods, bark, etc., in spite of the recency of abandonment can be accounted for in no other way. The remains of a 10-inch timber, whose length of 9 feet was not great enough for a main beam and which was over-stout for a secondary beam, were found in such a position that it might have been set on a slab in the floor (21, Fig. 56) as support for a part of the roof that had developed some weakness. Finally, the chamber was filled to approximately terrace level with clean adobe. (The bison bones with practically no other refuse stumped us.) Those parts of the structure that remained protruding were thoroughly robbed of stone (absence of building stones in the fill).

Once emptied, Kiva 16 presented many points of interest. There appeared to have been little or no remodeling. The ascending shaft of the ventilator (1, Fig. 56) seemed to have been very short because its east wall had an outward batter, which if continued upward would have resulted in an unduly large aperture. However, the late J. W. Hendron, a very careful and intelligent worker, who excavated this kiva anew and restored it, carried the shaft to the presumed full height of the kiva. Our 1929 section, therefore, may have erred as to the amount of batter. Be that as it may, the eastern base of the shaft was of large stones on end (2), one of them a metate.

The horizontal shaft (3) was in excellent condition, five of its nine cedar roofing poles (4) intact, the ends of the others still in place. They had supported flat stones; some remained in place, the others lay on the smooth green shale floor of the shaft. Just within the orifice was a small pit (7) just east of a slab (8) set vertically, the two forming a water stop. The orifice had had a wooden lintel (5) supported by two posts (6, 6) one on either side of the water stop slab. Each had been set on a small piece of sandstone on which was the mark of the post's butt. The lintel had borne the one long and two short stones seen in Amsden's photograph (1929:4).

Just west of the orifice there was let into the floor a roughly circular landing slab of limestone (9), its natural markings shown on Amsden's

plan. Again to the west, was an unfloored ladder pit (10), the top of the western elements of its slab lining set a trifle into the masonry of the deflector (Fig. 56). The latter (11) was conventionally three-sided, the stones of the higher east side shoved badly out of position (Fig. 57c). The two wings, each faced by an upright slab, were as usual lower. Fragments in the ash pit (12) were probably from a large slab supported by the wings (dashed line in Fig. 56, section). The firepit (13) was lined, doubly on three sides, and floored with heavily burned slabs. The two flat stones set in the floor south of the pit were smooth-surfaced but lacked the evidence of having served for grinding generally offered by stones in that position. A little farther south, however, were embedded two other stones (15) definitely cupped by such use.

The last of the more conventional kiva features were the loom-loop holders on either side of the firepit (16, 16). All were of ash, packed wet into holes about 7 inches deep by 4-5 in diameter to hold the usual twig loops. The set of six on the south was 5 feet 6 inches long. Each end holder had been done over, seemingly to straighten the alignment. The two by themselves were not part of a line, as careful search of the floor failed to locate others. The northern group of fifteen revealed little order, but the floor thereabouts had been badly torn up in ancient times.

The hole (22) of the same size as the foregoing was also full of ash, but had held no twig. The notes do not state whether or not the ash had been wet to a paste. Amsden (1929:8) believed this to have been a sipapu, but so far as I know, small sipapus everywhere else normally contain only clean sand. There was, however, toward the west end of the axial line bisecting ventilator, deflector, and firepit, i. e., in the usual location of the sipapu, a deep hole (20), its slab cover concealed under the floor. It contained a waterworn black stone about 18 inches long, its vague suggestion of an animal's body slightly enhanced by work with a pecking stone. Around this had been wound many times a string of nearly a thousand Olivella shells (Kidder 1932:Fig. 158). With it were three small white pebbles, two bits of mica, a fragment of unworked turquoise, and a stone disc bead. Whether this elaborate deposit and that similarly located in Kiva 7 should be classed as sipapus, is a question.

A second repository (18), the slabs that covered it also concealed by the thin floor, contained two fragments of a polished green limestone slab on which were incised a four- and a six-pointed star. There was also a granite oval about the size of an ostrich egg with a deep groove cut half-way around its long dimension. A fourth hidden, slab-covered cavity (17) was empty, save for some dark rotted substance, presumably remains of a perishable object. The only repository whose slabs were at floor level and therefore visible lay just west of the firepit (14). Four well-preserved cedar sticks, one to be seen in the photograph (Fig. 57c), bore the slabs. In it was a small two-handled jar, white slipped, decorated with terraced figures in glaze (Kidder and Shepard 1936:Fig. 243f).

Fig. 57. Kivas: a, looking north at ruins of west side of Quadrangle before excavation. At left, Guardhouse Kiva I (Fig. 62), eastern of two squared roof-support posts protruding. Photo. taken from southwest entryway, which was later found to lie below shovel and small pick; b, Kiva 16 from south, showing unusual reduction in size of firepit by introducing extra slabs. Paul H. Nesbitt taking notes; c, Kiva 16 (Fig. 56) showing repository for cached vessel, one cover slab removed, firepit, deflector with ends of its wings faced with vertical slabs. Line running obliquely up in masonry at right of ventilator orifice shows right (south) edge of V-shaped trench, dug to east from main kiva pit to accommodate horizontal passage of ventilator. Masonry still in place, in corresponding position at left, indicates north edge of trench. S. Y. Liang in mouth of passage; d, firepit of Kiva 4. Half of large slab over ash repository still in place (see also Fig. 49).



a



b



c



d

As may be imagined, the above finds led to an extra-careful examination of the whole floor. It had but one level, smoothed clayey shale spread in a very thin coat over such slabs as were sunk a little for concealment. Other slabs were set with surface flush with the floor. The group of four (19) raised high, but vain hopes. No postholes were found.

Other seemingly ceremonial objects from this kiva were a small two-handled vessel of rough dark ware (*ibid.*: Fig. 243h) from among the displaced stones of the deflector; and a terraced pipe in the fill close against the southeast wall, as if it had fallen out from between the wall stones.

Kiva 14 (Figs. 58, 59, 60) lay close to and a little south of west of Kiva 12. As shown in Singleton Moorehead's drawing of the southwest corner of the Quadrangle (Fig. 23), it was not far from where the southwest entryway opened into the plaza. A circular depression edged by the masonry of the top of a wall clearly marked its presence. It was one of three kivas in the plaza that were recognized as such by Bandelier (1881, Pl. IV).

Not quite as perfectly circular as were most of the round Pecos kivas, its diameters varied from just under 20 to a trifle over 21 feet.

The wall, practically uncoursed, was largely of stones whose faces and edges were much battered (Fig. 60a, d). They gave the impression of having seen long service, as they may well have if they came from ruins on the West Terrace that were easily accessible through the entryway. As has been said, it seemed that the later walls of those structures had been built of material robbed from earlier ones and they in turn from walls still older. A few waterworn cobbles, as well as the halves of two broken metates, had been used in Kiva 14. No plaster whatever remained. How thick it had doubtless once been was shown by the presence of plaster in paper-thin, greenish-white layers to a thickness of nearly an inch and a half, in a slab-lined recess 2 feet above the floor in the southeast arc (17, Fig. 58).

At floor level there was incorporated in the west wall some 5 feet of the straight wall of a room of an early Black-on-white building. We found parts of this building deeply buried all along the southwest side of the plaza (16, Fig. 58; outlined in Fig. 60d).

The ventilator had almost completely collapsed. From within, it was impossible to follow the horizontal passage (2, Fig. 58) for more than a foot. That far, at least, it had been lined with slabs. A trench dug outside the wall failed to reveal more of the passage or any trace of the vertical shaft. The ventilator's in-kiva orifice had had wooden jambs, squared uprights 3 inches wide, 1 1/2-inch thick, 2 feet 10 inches high (shown just west of either end of the water-stop slab, 3, Fig. 58). They were set on a wooden sill (4, Fig. 58b) and supported a lintel, also of wood. East of this lintel was a second wooden element apparently of about the same width and thickness. It may have been merely the westernmost of several pieces that had roofed the horizontal passage, as in Kiva 8 or it may have been so placed as an aid to the lintel

in bearing the great weight of the wall above the ventilator orifice. The two, however, were unequal to the task, for they gave way and the stones above them fell until a natural arch was formed (Fig. 60a). I believe these wooden appurtenances of the ventilator must have been of pine rather than cedar, because all had completely rotted and were represented only by impressions in the adobe. Yet this kiva was certainly not built prior to 1680, very likely not until after 1700, and much cedar of considerably greater age was found elsewhere in relatively good condition.

The floor of the horizontal passage was of black clay. Set in it just within the orifice and extending across the passage was an upright slab, 3, doubtless a water stop, but without the catch pit that often lay in front of or behind such a slab.

Just east of the ventilator orifice was a large, thin, cracked landing slab and some smaller ones, 5, Fig. 58; with smaller pieces removed, in Fig. 60c. This set of slabs had been laid flush with the earliest of the three successive floors; the second floor had been laid over it, and flush with the third was a smaller rounded slab (shown in section in Fig. 58b, in dashed line in a). West of the slabs was an elongated ladder pit, 6. The field notes state and a drawing shows that this had been covered with a slab and somewhat underlaid the east side of the deflector, or at least the latter's heavy coating of adobe and plaster. It contained no trace of ash, but its slabs were fire-reddened. Because the ladder pit had obviously become disused, the ladder is shown in the restoration (Fig. 58b) rising from the late floor.

The deflector, 7, was of small-stone masonry masked by a layer of yellow adobe bearing many very thin coats of greenish-white plaster, the whole being just over 3 inches thick. The adobe and plaster had also covered the large slab that roofed the ash repository, 8. The slab, the two ends of which had rested on the high side slabs of the repository, but whose rear edge was unsupported, had broken down under the weight of the fill (Fig. 60a). After we had pumped out the water, with which a succession of cloudbursts had kept the just-excavated kiva flooded for over a month, the cracked slab was straightened up and I photographed the deflector from the south (Fig. 60c) and the west. The latter picture was a failure and before I learned of this the kiva had been back-filled. But by great good luck, my 9-year old son had taken, with a two-dollar Brownie (1924 price!), the excellent view in Fig. 60b.

The ash that filled the unusually deep repository also banked up against the deflector. When the repository and firepit had been freed of water, the ash from the two was dried and screened but yielded none of the flint chips that we had found in some other kiva ashes.

The firepit (9, Fig. 58 and Fig. 60a-c), slab-lined and floored, had been surrounded on three sides with slabs set horizontally in the lowest floor and covered by the second and third. My notes do not specify whether or not the grinding slab that occupied the conventional position south of the pit had also been covered. Such a slab seems, however, to

Fig. 58. Kiva 14. At southwest corner of plaza of Quadrangle (Fig. 23). For heavy buttressing against exterior of northeast arc, see Fig. 59c: 1, vertical shaft of ventilator (had been destroyed); 2, horizontal passage of ventilator roofed with wooden slats; 3, vertical slab water stop; 4, wooden sill of ventilator orifice from which rose wooden jambs shown in a; 5, landing slabs set in earliest floor, dotted area in a indicates round slab in later floor (shown graphically in b); 6, slab-covered ladder pit, possibly underrunning deflector; 7, masonry deflector, black border indicates heavy plaster (see Fig. 60b, c); 8, ash repository; 9, firepit (note, in plan, grinding stone south of pit); 10, depression in middle floor; 11, depression in lowest floor, it and 10 held shell and turquoise offerings; 12, 13, depressions in lowest floor, empty; 14, point on lowest floor where lay shell, turquoise, squash seeds; 15, 15, squared pine roof-supports; 16, part of Black-on-white phase wall, see Fig. 60d; 17, wall recess in southeast arc; 18, 18, present and probably also approximately original surface and supposed location of hatchway; 19, supposed placement of ladder.

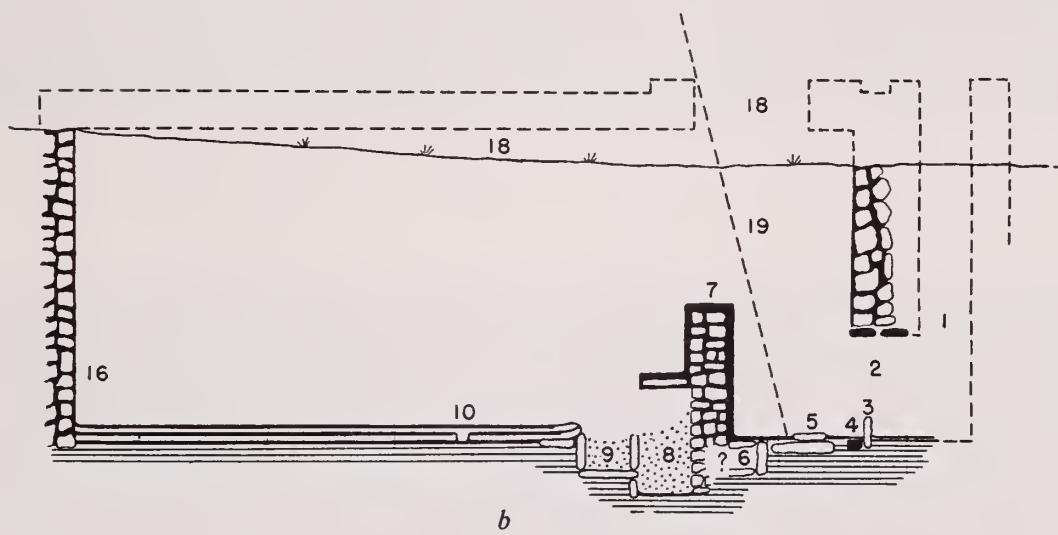
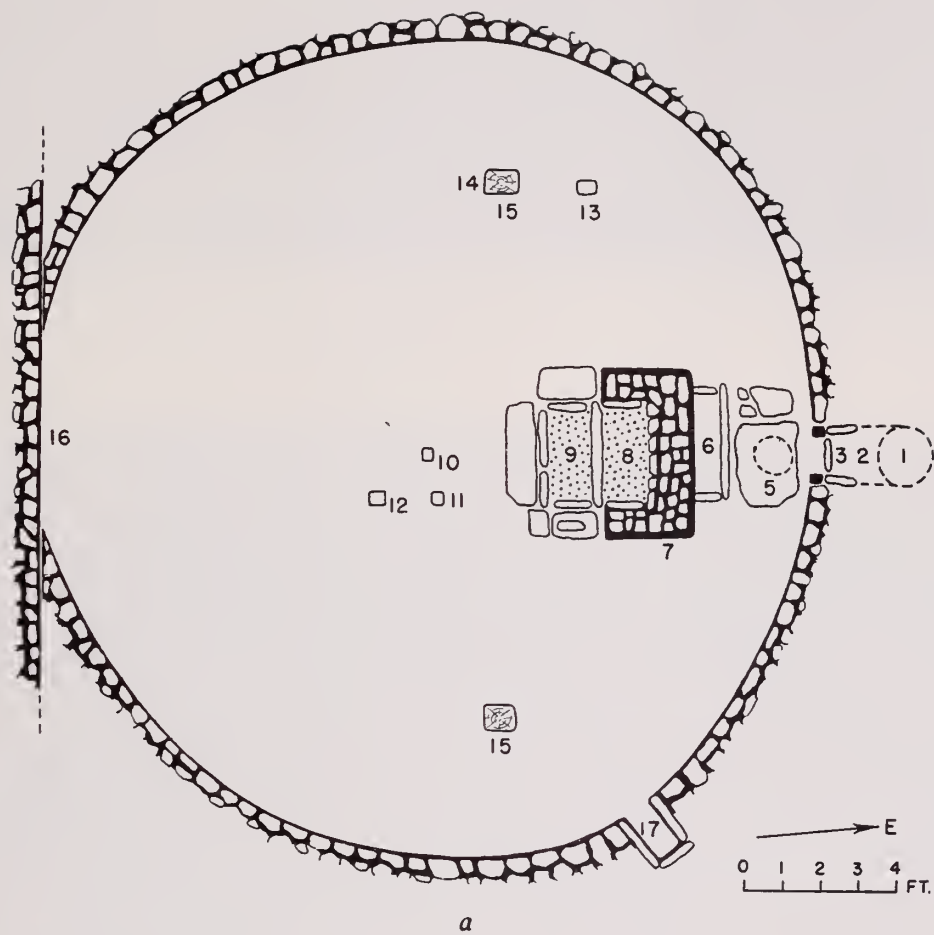


Fig. 59. Kiva 14 (Figs. 58, 60): a, excavation in progress, looking north; roof-beam leaning against west wall; each workman has a sherd box; b, pumping out kiva for second time; c, north arc of kiva, heavily piled support of northeast part of wall. At lower right, bench of Kiva 12, from which rocks of the supporting pile have been removed; x marks slab on north side of Kiva 12's west passage.



a



b



c



b



c



b



a

Fig. 60. Kiva 14 (Figs. 58, 59): a, cleared, but flooded by heavy rain; looking east, showing single large slab across arms of deflector broken down into ash repository; fireplace with surrounding slabs; butts of squared pine roof supports; ventilator orifice beyond deflector; b, deflector from slightly north of west showing slab over ash repository reset; it originally was covered with same heavy layer of adobe and plaster as rest of deflector; c, looking down from south; in front of ventilator orifice a cracked landing slab and a ladder pit; d, west wall, incorporating part of ancient Black-on-white house wall (outlined); see also 16 in Fig. 58.

have been so essential a part of kiva equipment that I think it must have been left exposed.

The three floors were better preserved than in any other kiva. The lowest had been spread directly on the smoothed surface of the native red clay. In the sectional drawing (Fig. 58b) the second and third had necessarily to be shown slightly separated from it and from each other, but actually there had been no intervening spaces. Each was a fine-grained black layer about an inch thick, each meticulously smoothed and probably once almost polished.

There were no loom-loop holders, but in examining the floors in search of them several features of interest came to light. The first was a 4-inch square depression, 10, about 1 inch deep, in the middle floor. In it was some decayed wood, possibly the remains of a container or cover, part of a shell "tinkler" and 3 small turquoise disc beads. Near it in the lowest floor was another depression, 11, also with wood-rot; it contained 3 abalone shell beads and one of turquoise. Just west of the northern of the two roof supports (15, 15) there lay on the lowest floor (at 14), but not in a depression, a patch of wood-rot and a turquoise pendant and bead, a fragment of Unio shell and 2 decayed but surely recognizable squash seeds. East of the same roof support was still another depression, 13, in the lowest floor, 9 3/4 by 4 inches, 1/2 inch deep, with wood-rot but no offerings. I worked all three floors carefully myself in the general east-west axial line between the firepit and the west wall in a fruitless search for a sipapu. The only thing that might possibly have played such a role was a 5-inch square hole with rounded corners filled with black clay (12). It had been sunk from the middle floor some 9 inches into the sterile red clay. It was covered and completely concealed by the latest floor.

The roof, as was the case with so many Pecos kivas, had evidently been removed. Whether in the present case this had been done by the natives or by Whites after the abandonment of the town, we could not be sure. In either case, none of the main beams remained except the single 10-inch pine timber left leaning against the west wall (Fig. 59a). However, many more-or-less rotted pine cross members and quantities of unburned cedar bark lay partly on and partly under stones and adobe fallen from the walls. There were two vertical roof supports, 15, 15, of pine, well squared to about 8 by 11 inches. Both were rotted off at a height of about 18 inches. The better-preserved northern one we dug out, but it was too badly decayed for dendrodating. It had been sunk 18 inches into the hard red clay, its butt set on a flat slab, as was the usual Pecos practice when a beam was let onto the ground. Small slabs and clay had been tamped tightly down to hold it firmly in its oval hole.

This chamber, as shown in Moorehead's drawing, was not entirely subsurface; the eastern arc, because of the slope of the plaza, protruded somewhat more than the western (Fig. 58b). Stones retaining bits of adobe plaster that were found in the kiva showed that the wall was smoothly finished on top and on the upper part of the exterior with that substance.

In the sectional drawing, the probable location of the hatchway and ladder are indicated, 18, 19. On the floor between the ventilator orifice and the deflector there lay, on a skim of rubbish, a large slab and fragments of others. The first, Vaillant and I believed perhaps to have been a partial cover for the hatchway in case of rain, the smaller pieces, parts of the hatchway's coaming.

Although the so-called guardhouse kivas, to be described below, may have been built later, the present structure must have been one of the last, if not the very last, of the conventional kivas. That it was built after Kiva 12 was abandoned is proved by the fact that the whole upper part of its northeast wall was laid up against the great mass of stones that rested on the bench of Kiva 12 and filled its west passage or entryway (Figs. 44a, 59c). This, of course, must have been done before the latter was filled, which, as evidenced by a cache of bowls on its floor, took place after the opening of the Glaze V phase. Further proof is supplied by the potsherds in Kiva 14, all but a few early strays being of types more recent than anything found in Kiva 12. The oldest, always excluding the strays, were of the late, thick-rimmed type of Glaze V. Sherds of Modern Painted ware, Plain Red, Plain Black, as well as bits of china showed that Kiva 12 had remained long in use, possibly until the departure of the Pecos in 1838.

Kiva 12. We came upon this puzzling structure in 1925 in the course of exploratory trenching at the south end of the plaza. We had been uncovering deeply buried walls of a Black-on-white building, with refuse of that phase and of Glaze I and II from red clay subsoil practically to the surface. But when, as we worked south, we crossed a rather crude wall, its top just under the grass-roots, we found ourselves in a deposit yielding Glaze V sherds clear to the bottom and many bison bones. At Pecos, the latter have never come to light in quantities in early rubbish.

What we had encountered turned out to be a more-or-less circular affair 41 to 43 feet in diameter, and nearly 12 feet deep (Figs. 44a, 61). An upper wall ran down to a broad unpaved bench from the edge of which a lower wall extended downward. There was no floor, the bottom being a broad, very shallow scoop in the compact red clay that covers this part of the mesilla.

We dug a trench across the middle, and followed the bench more than halfway around. The decorated pottery in all parts of the fill save the top few inches was early, thin-rimmed Glaze V. On the very bottom was a group of broken bowls of the same type. Our crosscut trench was not in the axial line. It therefore did not meet the east wall where the ventilator orifice would have been situated, if there was one, but it certainly would have encountered a fireplace, and I am sure one did not exist.

On the west side, running 8 feet west from the bench, was an opening (1, Fig. 61; Fig. 44a). Both inside and out were great quantities of building stones heaped in to form part of what in the field notes of G. C. Vaillant, who was in charge of this part of the dig, I find charitably called "buttressing." It supported the southeast arc of Kiva 14. Some of this

mass is shown in the plan and section (Fig. 61), but not the stones that had been thrown down into the above-mentioned opening. Their presence, of course, proved conclusively that Kiva 14 was built after Kiva 12 had been abandoned, but they had so crushed and broken down the opening, 1, that we could not be at all certain as to its original construction. There were vertical slabs on both sides of its mouth, as well as rotten remains of short pine beams 5-6 inches in diameter that had either roofed it and formed the east side of a manhole, as tentatively restored by Vaillant in Fig. 61, upper left, or had been used as risers in a short stairway running from bench to surface in an unroofed gangway, as equally tentatively restored by Kidder in Fig. 61, upper right. Actually, the state of smash, displacement, and later filling with rocks was so great that the only elements of this passage or gangway of whose position we could be sure were the slabs at either side of its mouth (one marked x in Fig. 59c), and the masonry of its sides and west end.

As has been said, the Glaze V potsherds in the fill were of the early, thin-rimmed variety. Toward the top were a couple of bits of blue-and-white china. Close under the surface (at 3, Fig. 61) were several of the oddly-shaped waterworn stones, that often occurred alone or with other evidently cult objects (Kidder 1932:104, Figs. 63, 80, the latter illustrating one of these stones from Kiva 12). In the upper part of a two-story slab cist (4) were more of the waterworn stones and two stone idols (*idem*:86, Figs. 62, 63a, 64).

The partial excavation of this large, deep structure was a long process, during which Vaillant and I spent much time trying to make up our minds as to what it might have been. It was called a kiva in our notes as soon as it became clear that its wall was curved. But when we learned that it was nearly twice the size of any other Pecos kiva we had dug; that it had no floor, no firepit, and possessed an encircling bench, a feature not seen in any Pecos kiva or, as far as we knew, any other prehistoric kiva in the Upper Rio Grande, we toyed with the idea that it might have been a cistern.

If the above-discussed opening had contained a stairway it might have served to provide a way down for people getting water from the capacious area below the bench. But the deposits in the bottom and the bottom itself showed no sign whatever of water having stood there. And if it had, one would think that it would have so softened the adobe mortar of the lower wall as to have brought about its collapse.

There was no evidence that Kiva 12 had been roofed. There were some pieces of rotten logs that seemed to have been thrown in with the rest of the fill and a length of the trunk of a sizable pinyon tree with the butts of branches at one end. But although this seemed to have been set vertically in the clay bottom, it was not long enough to have been a roof support.

The fact that this strange structure had apparently stood open argued for its use as a cistern, as did the gangway with steps, as restored by Kidder (Fig. 58, upper right). Both Vaillant and I, however, finally

came to think that it probably had been planned as a Great Kiva, that the necessary excavation had been done and the walls built; but that the project, for some reason or other--possibly opposition by a native "low church" faction or the resident Spanish priest--had been given up before a roof had been built, the walls plastered, a floor laid, or a firepit installed. Points in favor of this hypothesis are that Kiva 12 is almost exactly the same size as the Great Kiva in the Rito de los Frijoles which, like Kiva 12, had a very similar opening at the west (Hewett 1909: Fig. 89; Hendron 1940: Plans A, B). The Great Kivas of the Chaco culture at Pueblo Bonito, Chetro Kettle, and Aztec, although of course much older, had an encircling bench--as, indeed, does the present-day large circular kiva at San Ildefonso--and access to them was had by a covered gangway and stair at the north (the axis of San Juan kivas is normally north-south instead of, as in the Upper Rio Grande, west-east).

Whether cistern or kiva, it is clear that the structure under discussion was not dug until well after the Quadrangle had taken final form in Glaze III. It dates from the opening years of the Glaze V phase. There is no indication that it stood empty for more than a very short time. Then it was filled, not by gradual accumulation of rubbish but in a rapid series of purposeful dumping operations that took place during the first part of the vigorous Glaze V period, when Pecos potters had given up the use of the red slips favored during Glaze IV and were returning to the light colors of Glazes II and III, but had not yet developed the strong thickening of the rim characteristic of later Glaze V.

Kiva 19. This is one of the three numbered kivas, on which no work was done. Its presence in the East Terrace (Fig. 21), suspected from surface indication, was made certain by a heavy deposit of green clay on the slope similar to that below Kiva 21. My notes do not mention the presence in it of bones from disturbed skeletons. Several graves had been sunk into this clay, but as luck would have it, a datable pot occurred with but one of them. The skeleton, that of an adult female (No. 329), was accompanied by two Glaze V bowls. A little to the east were the graves of another adult female and of an infant (Skels. 306, 325), the former with a Biscuit B bowl, the latter with a Glaze IV bowl. Neither my running notes on the trench nor the skeleton cards relate either to the clay, but their recorded depth would seem to place them either under it or on the level of the surface upon which it had been thrown down. Kiva 19 may accordingly have been dug during Glaze IV, but this is far from certain.

Kiva 20, in the East Terrace north of 19 and a little south of the east entryway into the plaza (Fig. 21), is marked by a distinct depression. This was noted by Bandelier (1881: 83, Pl. IV, F). He was told by Sr. Epifanio Vigil of Santa Fe that this and a second that he letters D (our Kiva 1) had been round masonry storehouses 10 to 11 feet high in which the Pecos kept their "garnered crops and forage." This, of course, was wrong as also was almost everything told him about corrals, granaries, and fields by Ruiz.

Kiva 22 marked by a large depression in the plaza north of Kiva 5 (Figs. 21, 41a), was not excavated. It is the one about which clings the local legend of the great serpent, recounted later.

Guardhouse Kivas

I call Guardhouse Kivas a group of aboveground square or squarish structures that were found to contain, or in one case probably to have contained, some of the floor features typical of the more conventional round, and at Pecos normally subsurface, kivas. The term "guardhouse" is used because all four that were certainly identified were located at entrances to the Quadrangle: H, at the northwest passage; I, at the southwest passage; J and K, on the north and south sides respectively of the east passage. There were surface indications of still another, which was not excavated, at the east side of the mouth of the southeast passage.

The function of these chambers is unknown. Square or rectangular aboveground ceremonial rooms are, to be sure, incorporated in several present-day pueblos. But they seem not to be particularly strategically placed, whereas those here under discussion commanded three of the four means of access to the plaza. All, however, were without much doubt entered through hatchways in the roof so that they could hardly have served either for defense or as lookouts. That they had ritual significance is evidenced by their fittings. I have toyed with the idea that the square kivas or the corner kivas of the local Black-on-white pueblos might have been prototypes, for at Forked Lightning and Dick's Ruin these opened on plazas. We have, however, no evidence that either of those types existed at the later Black-on-white buildings at Rowe or Pecos, although at Rowe the excavation was not extensive. The latest corner kivas so far known are those of the more recent buildings at Pindi, and were thus pretty closely contemporaneous with Rowe and the Black-on-white occupancy of the Pecos mesilla. The example at Dick's Ruin may possibly also be of this period. In this connection, too, should be considered the five "specialized rooms" at Pindi, square chambers, some with firepit, ash pit, and ventilator. Unlike square and corner kivas and guardhouses, none of these opened on a plaza or passage, all being surrounded by other rooms (Stubbs and Stallings 1953:31, Figs. 24-28).

In any case, the Pecos guardhouse kivas are all very late; three of them certainly, the other one probably, were built after 1600. It is quite possible that two of the three may date from after the Pueblo Revolt of 1680. None at Pecos, or similar ones, if they existed elsewhere, seems to have been mentioned in the early Spanish accounts. However, I doubt that such surface chambers would have been called estufas, a term apparently used by the chroniclers only for underground kivas.

Guardhouse Kiva I (Fig. 62) was much the best preserved. It lay on the north side of the west end of the southwest entryway into the plaza,

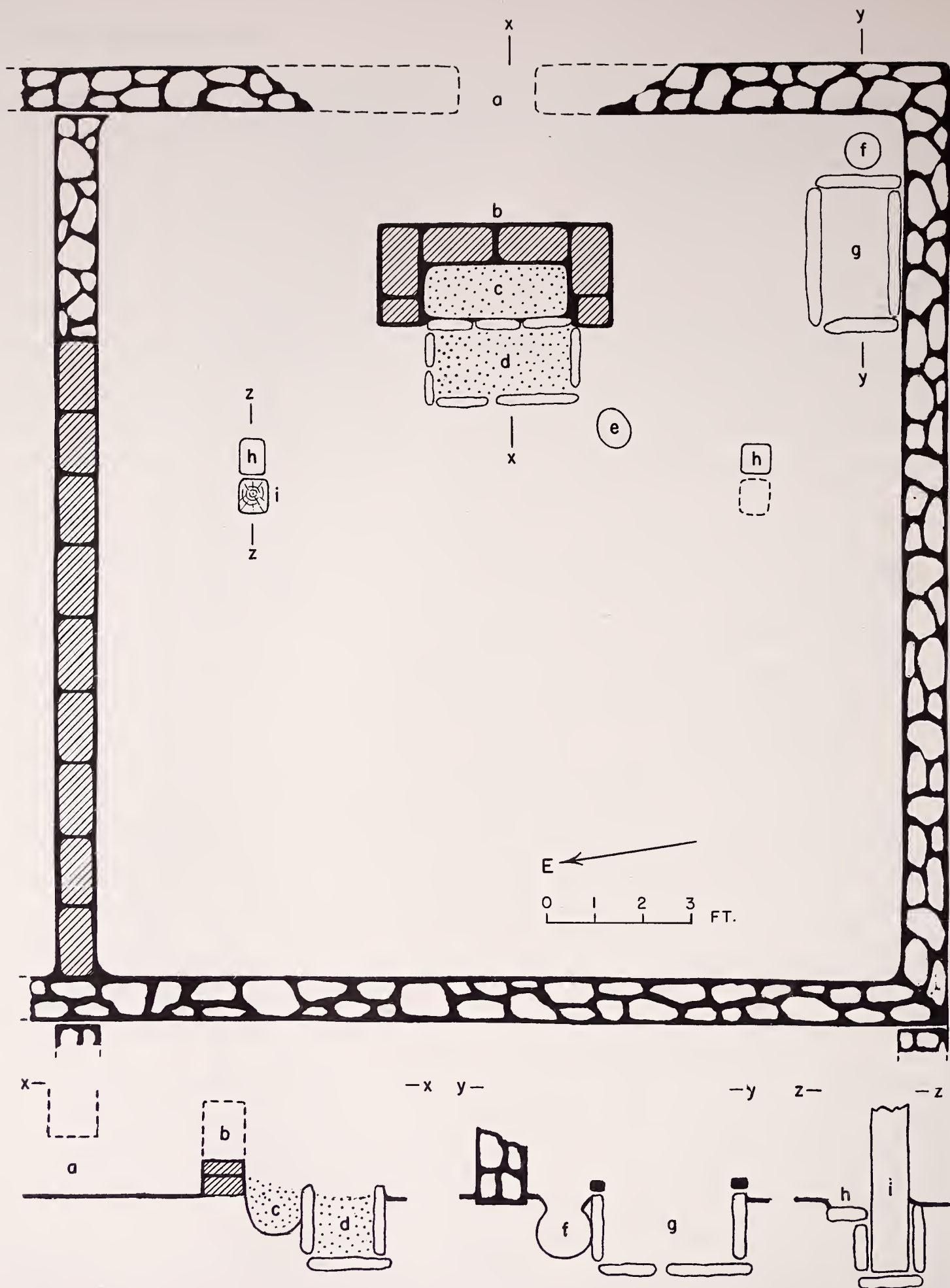


Fig. 62. Guardhouse Kiva I: a, door or more probably floor-level ventilator orifice; b, deflector of moldmade adobes; c, ash repository; d, firepit (see section x-x); e, large sherd set in floor; f, cooking-pot sunk in floor; g, pit lined and floored with slabs, those of the walls topped by well-shaped lengths of wood (for f, g, see section y-y); h, h, rectangular stone slabs set in floor south of beams; i, remaining one of pair of squared beams (Fig. 57a; section z-z shows slab setting of beam).

being the southernmost room on the west side of the Quadrangle proper. It was the only ceremonial structure found by us that opened to the south. Approximately square, it measured about 18 feet north-south, by 17 east-west. Its floor was on a level with that of the entryway. The central part of the south wall had been destroyed, probably by water draining westward through the passage. It was therefore not possible to tell whether a door or a small ventilator had existed at that point. I believe the latter, because only small openings appeared in comparable positions in Guardhouse Kivas H and J. The walls were much broken down, particularly on the south and west sides. They were of very poor, slipshod masonry; a large part of the east wall was of moldmade adobes laid on top of the stone wall of an earlier room (cf. Fig. 38c). The walls were coated with the light-brown, sand-clay mixture that seems to have been typical of most late construction. It was applied so thickly as somewhat to round the corners. Over it was pale green plaster in almost microscopically thin coats of which there were well over forty.

This is the southern of two rooms, each marked "I" on Bandelier's plan (1881:Pl. IV). He noted (p. 74) two squared timbers protruding from the fallen wall stones that cumbered the floor. The western of these we found to have disappeared, but there was a clear cast of its butt running down through the floor to a slab upon which it had been set (section z-z, Fig. 62). The eastern one was still in place (Fig. 57a). It measured 6 by 8 1/2 inches. A section has been dendrodated at 1552 (Smiley, Stubbs, and Bannister 1953:33) but, being from a squared timber, it may well have had many rings cut away. Bandelier believed that these and other squared timbers, used mostly on the western side of the Quadrangle, had been taken from the Mission during its pillage in 1680 (1881:72). At all events, they were pretty surely shaped after the colonization of New Mexico in 1598, when the Indians probably first obtained metal woodworking tools.

In the fill close to the base of one of the walls (the notes do not specify which) lay four terraced pipes (Kidder 1932:Figs. 146c, k; 147c, g. Guardhouse I is there wrongly called G). As a cache of six pipes of the same sort was found in a pocket in the wall of Guardhouse Kiva H, it is probable that these had similarly been tucked away.

Guardhouse Kiva H (Fig. 63). As for the foregoing, I use for this chamber Bandelier's designation (his Pl. IV). Because of its position at the extreme northwest corner of the Quadrangle, commanding an unimpeded view of the North Terrace and of all approaches to the Pueblo from the northwest, and also because the fallen stones of its unusually thick walls made a high heap, Bandelier naturally, but mistakenly, considered it to have been a watchtower and it is so restored in the model made in 1914 by Messrs. K. M. Chapman and J. P. Adams, now in the Museum of New Mexico (Kidder 1924:Pl. 5). It lies on the west side of the mouth of the northwest entrance to the plaza. Its strange lopsided shape was due to the fact that, having been built very late, it had to be squeezed between pre-existing rooms to the south and the edge of a steep

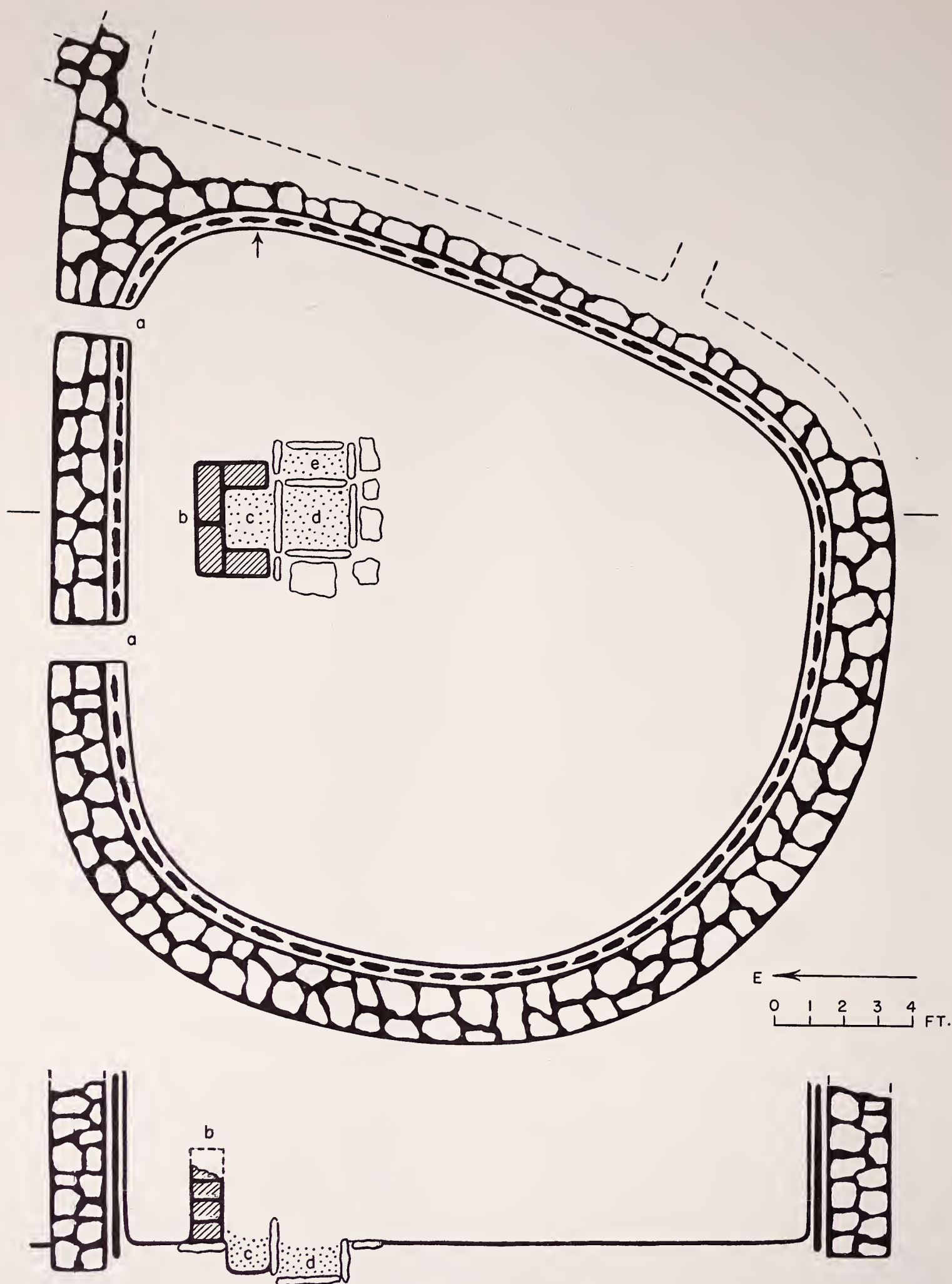


Fig. 63. Guardhouse Kiva H: a, a, twin floor-level ventilators; b, deflector of moldmade adobes; c, ash repository; d, e, later and earlier firepits. Arrow indicates location of pipes cached behind slats lining wall.

declivity on the north. It measures 22 feet in an east-west line through the firepit. The walls were badly broken down. Before excavation there protruded upright, among the welter of fallen building stones along the south wall, a line of wooden slats which I took to be part of a collapsed roof. When cleared, however, they proved to be elements of a lining, set between 3 and 6 inches inside the stone wall, around the entire chamber. The slats had been riven from pine, were 2-4 inches wide by 3/4-1 inch thick, were set close together, perhaps originally touching. Their lower ends were abutted by a hard, dark adobe floor, which held them firmly in place (see section, Fig. 63). Whether or not they had reached the full height of the kiva, probably 6 1/2-7 feet, could not be determined. This slat lining was coated with black adobe like that of the floor; it was, in turn, covered by a thin layer of brown that bore multiple coats of greenish plaster.

The stone wall behind the lining was evened with brown adobe. Between this and the slats was earth and a soft, dark material, perhaps a product of decay of the slats. In it, some 3 feet above the floor and 2 feet from the southeast corner (arrow, Fig. 63), was a pocket in which lay six terraced pipes of the same sort found in "I" (Kidder 1932: Fig. 146a, b, d, e; 147a, d).

There had been two firepits (Fig. 63d, e) and at least one ash repository, c, the latter surrounded by a three-sided deflector of yellowish moldmade adobes. This had been badly broken down and eroded, and large sandstone slabs lay over the firepits. I at first believed these to have been laid intentionally to cover them, but later thought they must be fallen elements from the edging of a hatchway in the roof. South of pit d was what seemed to be an older one, e, into which the southern part of d may have been cut.

Guardhouse Kiva H differs from the others in that it possessed two ventilator openings, a, a. They measured 12 by 12 inches and were at floor level, which was the same as that of the floor of the northwest entryway.

This chamber was built after 1540. Underneath its east wall was a bed of refuse containing Glaze V potsherds. Between the slat lining and the wall, and therefore probably dating from the time of building, were a few late Glaze V sherds.

Guardhouse Kiva J (Fig. 64, right) lay on the north side of the east entrance to the plaza. It was in very bad condition, the north and west walls gone almost to floor level, the southeast corner completely washed out. Its masonry was very poor, even for Pecos. No plaster remained. There had probably been a coating of adobe which would have softened the juncture with the walls of the triangular masonry fillings of the four corners (one shown in Fig. 38b) and would have produced a somewhat rounded effect, as is shown in the drawing. The chamber being some 16 feet square, the roof must have been supported by large, heavy timbers. No trace of these remained. They may have been removed by the Indians during the last years of the pueblo's occupancy or, more likely, were

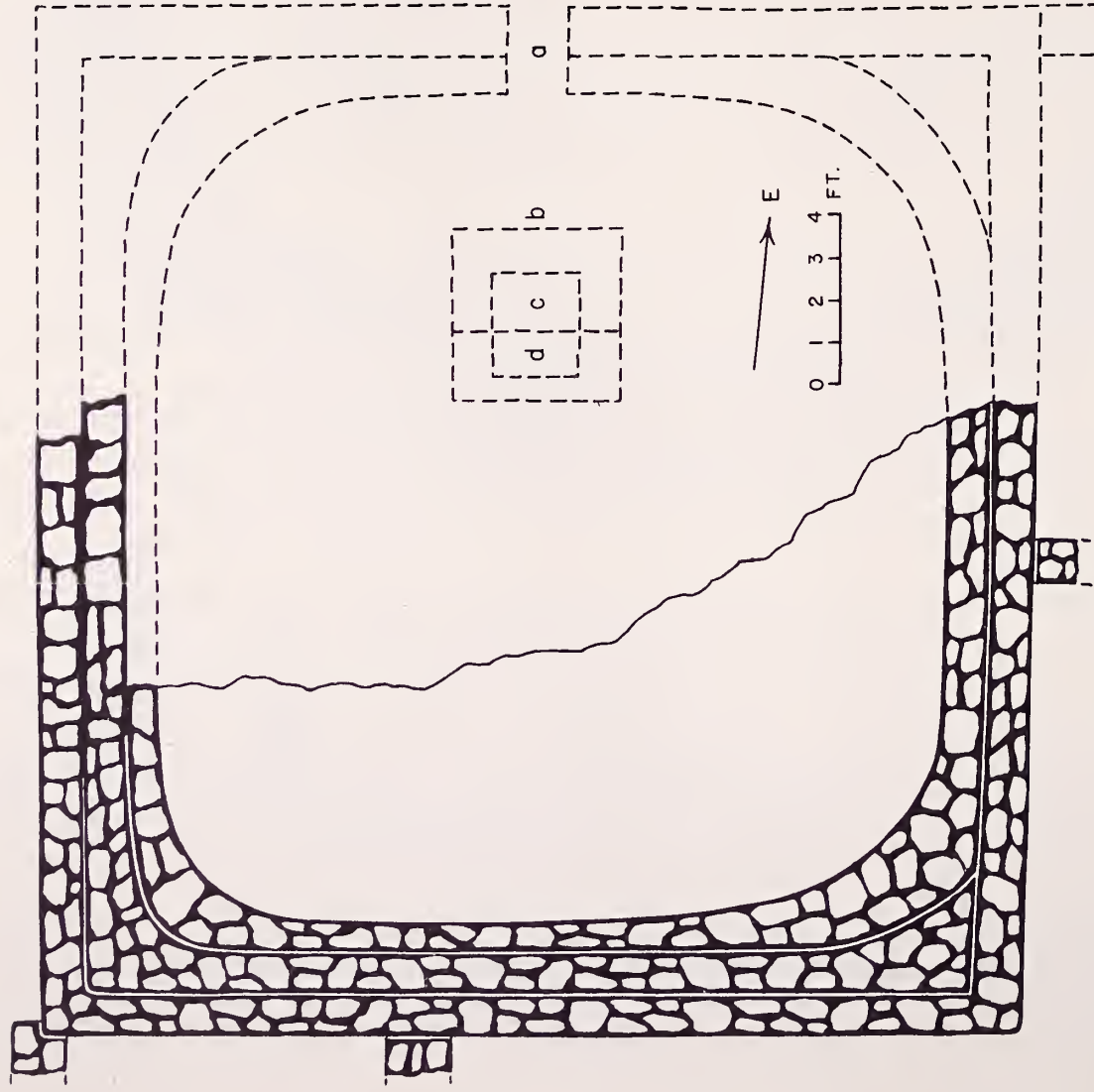


Fig. 64. Left. Guardhouse Kiva K. Missing floor features: a, floor-level ventilator; b, deflector, probably of adobes with slat reinforcements; c, ash repository; d, firepit.

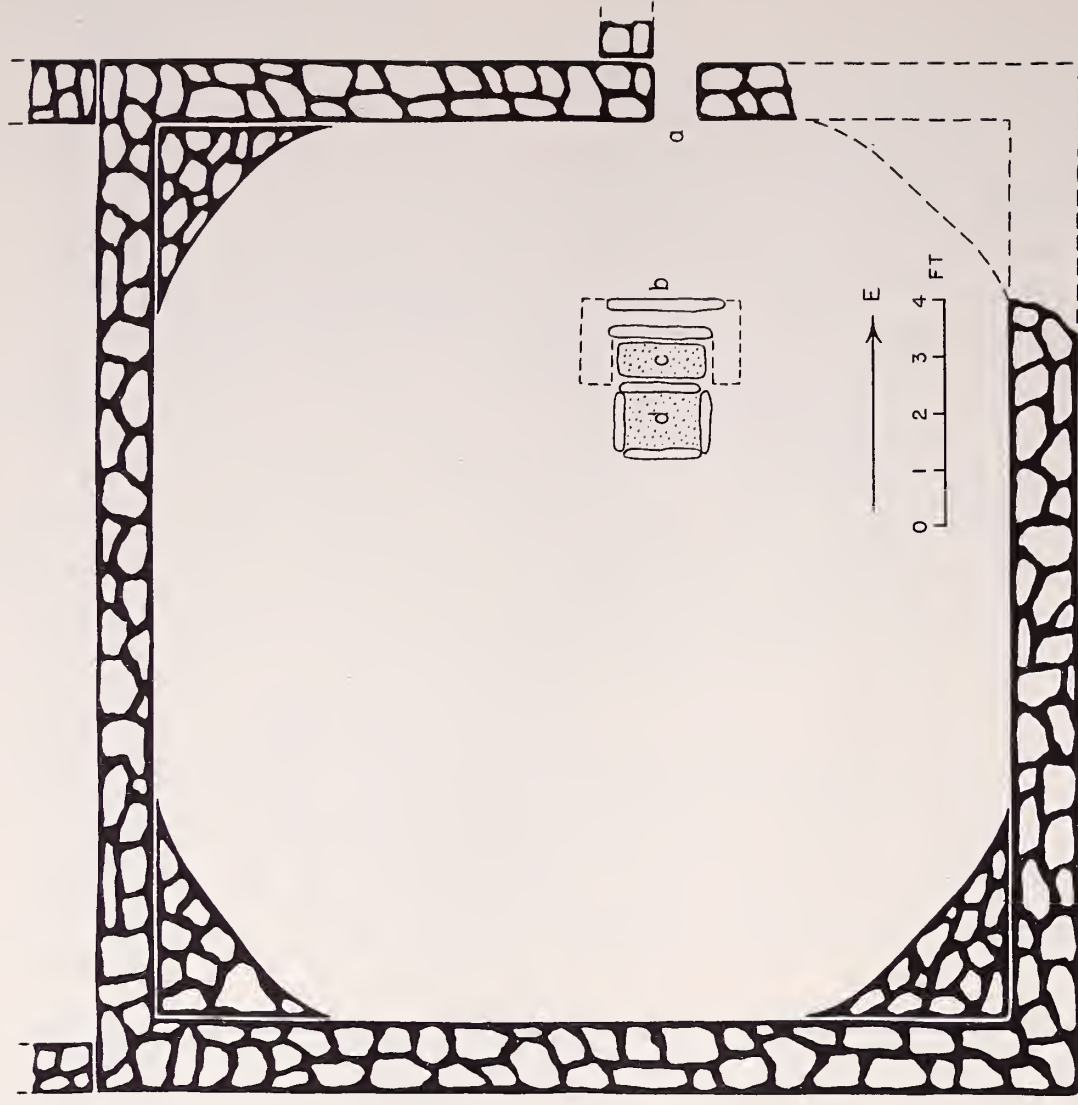


Fig. 64. Right. Guardhouse Kiva J. Floor features: a, floor-level ventilator; b, deflector, probably of adobes with slat reinforcements; c, ash repository; d, firepit.

salvaged by local Mexicans or chopped up for firewood by the many parties of traders on the Santa Fe trail. Falconer (1844:216), who spent a night at Pecos in 1841 with the other unfortunates of the captured Texas Santa Fe Expedition, says, "The houses were made more ruinous than on our arrival by the Mexican soldiers who made fire of the materials."

There were the usual firepit and ash repository, sheltered from draft from the ventilator in the east wall by a deflector of adobes, almost completely destroyed, but undoubtedly of conventional three-sided form, but with two sandstone slabs incorporated in its eastern base.

The careful work of Guthe on the subfloor deposits and remains of the walls of several sequent underlying structures showed that from Black-on-white times to the opening of the historic period, the spot had again and again been built upon. Then there was a short period of disuse during which there apparently was robbing of stone, a leveling of the ruin, and the establishment of a corral in which a 2-inch layer of manure accumulated. This was topped by a little refuse shortly before the building of the guardhouse.

Guardhouse Kiva K (Fig. 64, left) lay just south of the opening of the east entryway. It and the other easternmost rooms of the Quadrangle near that point had been built on the eastward projecting edge of the mesilla some 5 or 6 feet above the level of the East Terrace. As the pueblo disintegrated, pressure from the great mass of buildings to the west pushed the eastern parts of these rooms over the edge, the wall stones lying heaped on the terrace.

There had been three stages in the construction of Guardhouse Kiva K. First was built a probably square chamber 22 feet wide north-south. This was then, or later, partly lined with a thin, rather well-laid wall that served somewhat to round the square northwest and southwest corners of its predecessor. It was coated with reddish adobe and finished with multiple layers of thin green plaster. Finally, this wall had itself been apparently entirely lined with another of much cruder masonry that brought the room to still more nearly circular form. The last lining bore no adobe coating or plaster, but it is quite possible that after the roof had been removed it had stood so exposed to the weather that these had been washed away. I say that the roof had been removed because, as in J, no beams or other roofing elements remained, whereas in the next room to the south were the well-preserved remains of a first- and a second-story roof, but so buried under walls fallen from further west that they could not easily have been recovered for firewood.

Unfortunately, the floor, almost to the back of the room, together with whatever fittings, such as firepit, deflector, etc., there may have been, had gone down with the east wall.

Other possible guardhouse kivas. At the south end of the south extension of the Quadrangle's west side there could be discerned the remains of two structures (marked with interrogation points in Fig. 21; lettered O, O by Bandelier 1881:Pl. IV). These both seemed to us to be square, but in Bandelier's time they were apparently in somewhat better

shape, for he noted (p. 84) that the four corners of the eastern one had been cut off as in Guardhouse J, giving it an octagonal form. Because of this, a guardhouse is shown at the end of the extension in Moorehead's restoration (Fig. 23).

OCCULT ASPECTS OF KIVAS

Kiva Cults

Serpent cult. That Awanyu, the Plumed or Horned Serpent of Tewa mythology, is represented by the five-pointed figures of the Biscuit wares, seems very doubtful (Kidder and Amsden 1931:124; Wilson 1918). But there is no question that this being appears at Pecos again and again, incised and in relief on presumably ceremonial pipes of the late, perhaps entirely post-Spanish, period (Kidder 1932:180). There are no realistic depictions of snakes on Pecos pipes or pottery. Queerly enough, in view of their importance in Pueblo esoteric lore and ceremonial, real snakes almost never appear in any form of Pueblo art, ancient or modern. Even on Mimbres pottery, on which naturalism runs riot, realistic snakes are "scarce" (letter of 17 September, 1956, from Dr. Hugo G. Rodeck, University of Colorado Museum, who is studying intensively the biota of Mimbres painting). The horned serpent concept must have been derived from Mexico. Whether or not the idea reached the New Mexican Pueblos in prehistoric times I do not know. It might conceivably have been introduced by Mexican Indians accompanying Coronado. However, the horned or feathered serpent was known as far north as Chihuahua at least as early as the 15th century, for it appears unmistakably on Ramos Polychrome pottery (Kidder 1916:Figs. 7-9).

Nevertheless, it seems certain that not only was the serpent venerated, but that a very large snake was harbored by the Pecos, possibly in a kiva, but much more probably in a cave. My Mexican workmen all believed this. Willa Cather must have picked up tales of this sort, for in her delightful "Death Comes for the Archbishop" she has a Pecos Indian lead the cleric to shelter from a storm in a cavern where one is to suppose such a creature was concealed. Parsons states (1925:134), "there is considerable probability that the [Jemez] Snake society is of Pecos origin."

Bandelier (1890:305-307) says, "It is positively asserted [by the eastern Pueblos] that the Pecos adored, and the Jemez and Taos still adore, an enormous rattlesnake, which they keep alive in some inaccessible and hidden mountain recess." Mariano Ruiz, the aged Mexican who, as a boy, was adopted into the Pecos tribe and who gave Bandelier much information about life in the pueblo, affirmed that as far as Pecos was concerned this was true. He, however, never saw the snake.

Legend even connects the abandonment of Pecos with one of these great reptiles. E. S. Curtis (1926:20) was told by a grandson of Ruiz that he had heard from his grandfather that the snake was kept in an underground room and was fed with newborn infants. Ruiz one day met a young Indian looking very downcast. He said several of his children had already been lost in this way and that he had been called on for a baby to

which his wife had just given birth. Ruiz advised him to kill a young kid, fill it with poison, dress it in the baby's clothes, and give it to the snake. This he did. That night were heard terrible roarings and thrashings and when in the morning the terrified people looked down the hatchway they saw the snake on its back, its white belly-scales up, and knew it was dead. That, of course, was the end of Pecos.

Curtis told me this when he visited my diggings. I asked one of my older workmen about it. He said he had heard it too, and he pointed to the circular depression of Kiva 22 in the plaza just north of Kiva 5, as marking the chamber where the snake had perished. I was always tempted to dig that kiva, but I never did.

As to the carnivorous habits of this reptile, Gregg (1845:272) says that the bodies of those who died of exhaustion incurred in tending a sacred fire, "were carried to the den of a monstrous serpent, which kept itself in excellent condition by feeding on those delicacies. This huge snake (invented no doubt by the lovers of the marvellous to account for the constant disappearance of the Indians) was represented as the idol which they worshipped, and as subsisting entirely upon the flesh of his devotees--live infants, however, seemed to suit his palate best. The story of this wonderful serpent was so firmly believed in by many ignorant people, that on one occasion I heard an honest ranchero assert, that upon entering the village very early on a winter's morning, he saw the huge trail of the reptile in the snow, as large as that of a dragging ox."

Another story was passed on to me in 1920 in a letter from my late friend, J. A. Jeançon. "Have you ever heard," he wrote, "that the reason the Pecos people left the pueblo was on account of the escape of their snake god, whom they had abused, from a kiva there? It seems, according to a quite old and I think very truthful San Ildefonso Indian whom I know quite well, that his grandfather, who was related on one side of his family to the Pecos people, used to visit there and that once, when on a hunt, he met Pecos runners out tracing the snake, which was said to be huge. Illness, following its escape, aroused suspicion that evil days had fallen on the pueblo and those who were left went to Jemez. I also heard the same story at another town--Tesuque, I think."

More sinister, because of our own time and concerning the friendly and likeable Tewa with whom many of us have lived and worked, were hints heard by Bandelier of human sacrifice by snake-bite. This lead was followed up years later by Matilda Coxe Stevenson, who was given accounts which she believed to be true. She published these in a local newspaper and they were further noted in a report on the field work of the Smithsonian Institution for 1913 (Curtis 1926:163; Anon. 1914:79, 80). She had no proof for so serious an accusation. Furthermore, whether true or not, it could, and I have heard that it did, get Indians known to have been her informants into serious trouble. As a matter of fact, I had been in New Mexico shortly before and several of my San Ildefonso and Santa Clara friends told me gleefully how much fun they had had in pulling the old lady's leg.

A story, with no serpent involved, but concerning the abandonment of the town, was got by C. F. Lummis at Isleta. He calls it (1910:137) "The Drowning of Pecos." It tells how all the people of the town, sadly reduced in number as result of the wicked practises of the majority, had crowded into a single kiva for a contest in magic-making to which the evil practitioners of witchcraft had challenged the handful of good citizens. The divine Trues, appealed to by the proper formula, plucked the ladder from the hatchway so that none could escape, then brought on so terrible a deluge of rain that the kiva was filled to the roof-beams, drowning the malefactors to the last man. About the virtuous few, however, the water miraculously rose like a wall and they stood unharmed on a little circle of dry and dusty floor. The flood subsided and the ladder was replaced, but the survivors, not feeling able to carry on alone, deserted their ancient homes for Cochiti and Jemez. (In 1925 a Cochiti woman told me that one of her ancestors was from Pecos.) Query: was this tale not inspired by missionary accounts of the Children of Israel's passage of the Red Sea?

Undying fire. Ruiz told Bandelier (1881:82) that a fire, never allowed to go out, was maintained in a room in the northwest corner of the Quadrangle, opposite Guardhouse Kiva H ("I" on his Pl. IV and clearly shown in his view of the plaza, Pl. VIII). Ruiz said that the fire was "kept in a sort of closed oven--and not permitted to flame." My examination of what remained of this room in 1915 disclosed no evidence of such an oven or of unusual smoking of the walls. In view of the fact that he had been asked to tend this fire, it seems hardly possible that Ruiz could have forgotten where it was housed. I have wondered, however, if Bandelier might not have misunderstood him and that it had been in one of the kivas, perhaps Kiva 7, directly in front of Room I. In any case, Ruiz refused to serve, not only because it would have entailed a whole year's seclusion, but also because it was believed that anyone who had done so would surely die if he left the tribe (*idem*:126). That the fire was kept burning in a kiva rather than in a room is pretty surely shown by the following two quotations.

Gregg (1845, Vol. I:270-272), who had been at Pecos both before and after its abandonment, says: "Many curious tales are told of this ill-fated tribe, which must no doubt have tended to hasten its utter annihilation. A tradition was prevalent that Montezuma had kindled a holy fire, and enjoined their ancestors not to suffer it to be extinguished until he should return. In pursuance of these commands, a constant watch had been maintained for ages to prevent the fire from going out. I have myself descended into the famous estufas, or subterranean vaults, of which there were several in the village, and have beheld this consecrated fire, silently smoldering under a cover of ashes, in the basin of a small altar. Some say that they never lost hope in the final coming of Montezuma until, by some accident or other, or a lack of a sufficiency of warriors to watch it, the fire became extinguished; and it was this catastrophe that induced them to abandon their village.

"The task of tending the sacred fire was, it is said, allotted to the warriors. It is further related that they took the watch by turns for two successive days and nights, without partaking of either food, water, or sleep; while some assert, that instead of being restricted to two days, each guard was continued with the same unbending severity of purpose until exhaustion, and very frequently death, left their places to be filled by others. A large portion of those who came out alive were generally so completely prostrated by the want of repose and the inhalation of carbonic gas that they very soon died....." We have already learned of the disposal of their remains!

Abert (Emory 1850:456) was told in Santa Fe in 1846 that, "some ten or fourteen years ago, a wealthy individual of Santa Fe, who had been admitted to the estufas, or vaults, at Pecos, and who had profaned the 'eternal fire,' had been ever since perfectly deranged."

ASHES OF KIVA FIRES. No mention is made in the above references to what was done with the ash of the undying fire. Nevertheless, the Pecos felt and some, perhaps all, recent Pueblos still feel that there is a certain sacredness in wood ash. This was first brought to my attention by the carefully made ash repositories in many Pecos kivas. I at first thought it probable that the ashes were being saved for some utilitarian purpose, because in our second year at Pecos I had noted that the loom-loops in Kivas 1 and 4 had been anchored in lumps of hardened ash. I also remembered the hardened ash fillings of pot moulds I had excavated at Puyé and Tuyonyi (Kidder 1915:Pl. XIV). I also found that Cushing in "Zuñi Breadstuff" (1920:passim) repeatedly referred to the use of ash in cookery. But all these uses would have required far less ash than was produced in the kivas were, during the long winters, fires were probably kept going most of the time. I noticed, however, when this matter began to interest me, that the ash in the layers and lenses, so common in the Pecos middens, almost always contained more or less charcoal as, I also found, did the ash of fireplaces in living rooms, whereas that in kiva firepits and repositories was finer textured and very seldom held more than slight traces of charcoal. This cleanliness could reasonably be accounted for by the thorough burning, in the kivas, of fuel that would give maximum heat and produce a minimum of smoke.

Not until 1924 did I learn what ultimately became of these carefully saved products of the kiva fires. In that year my wife dug near Kiva 7 one of a series of tests we were making to study the stratigraphy of the deposits in the plaza. Close under the surface she encountered side by side two pits, each some 14 inches deep by 24 wide, constricted a little at the top. They were packed full of pure white ash. At the top of one of them lay a terraced clay pipe. This seemed to indicate that ash, presumably from kivas, in this case probably Kiva 7, had been buried ceremonially. Further evidence to the same effect came two years later when I ran across a similar pit being washed out of the east bank of the arroyo below the north end of the Quadrangle (Fig. 44c). After another two years, it had been carried away, but two others had become exposed.

At the top of one lay a pipe of the same sort as that from the plaza (Kidder 1932: Fig. 146f). And in going through my earlier notes I discovered that a similar pipe had been found in the ash repository of Kiva 4.

Although it was by then obvious that at Pecos kiva ash had ceremonial significance, I thought no more about it until I undertook the present report and switched from reading about the Maya in order belatedly to catch up with what, of recent years, had been written about the Pueblos. Then, of course, Elsie Parsons' "Pueblo Religion" proved a gold mine. In it (1939:458) she cites Voth as recording that at the close of the Oraibi Snake-Antelope ceremony the participants stand around the kiva fireplace, gather ashes, and use them in a cleansing rite. Other ritual uses of ash are listed by Parsons (*ibid.*: 462-64) and she states that ash constitutes, at Laguna and the eastern Pueblos, a "distinctively anti-witch prophylaxis." But only in the above-mentioned Oraibi instance does kiva ash seem to be specified. Nevertheless, it may well have been considered to possess greater efficacy and therefore greater sacredness than that from domestic hearths, and might explain why kiva ash, except the relatively small amounts needed for ceremonies, was preserved in the repositories and eventually buried in special pits. This is borne out by Smiley (1952: 32 and correspondence), who quotes Hopi and Zuni informants as holding that ash from kiva fires must be buried; hence it is stored until a sizable amount is collected before it is removed from the kiva to be so disposed of.

More light has also recently been thrown on the subject. Dr. Ellis in her valuable paper, "Jemez Kiva Magic" (1952:149) says, "Ash Boy, patron of the hearth and of the home.... resides in [is symbolized by] the ashes of the fireplace and also in those which have been cast out upon the village dump. Prayer plumes are placed on these dumps for him at the time of certain ceremonials, and in the past children who must go outside their homes at night were marked with ashes from the fireplace to insure protection by Ash Boy." In a footnote, she adds: "The sacred character of these dumps as residences of Ash Boy is the reason excavation of such areas customarily is strictly forbidden to archaeologists....."

One further word as to kiva ash concerns that of the firepits of Kivas 6 and 11 and, as I remember, but cannot find it noted, the firepit ash of at least two Forked Lightning kivas. These contained a number of small to tiny chips of fine white stone, the product apparently of the flaking of some special type of arrowhead. Parsons says (1939:85): "At Isleta a white arrowpoint serves for second sight, and with one in his hand a hunter describes vividly to his camp companion a flirtation that is going on at [the latter's] home."

Speaking of chips, I might mention here, although it presumably has no bearing on ceremonial practice, the fact that on almost every high point in the Pecos Valley--and I climbed a number in a vain hunt for hill-top shrines--there were scattered chips of obsidian and other stones. These spots would have made excellent lookouts for guarding fields or watching for enemies. It would seem as if men posted there had passed the time in chipping, as we, under like conditions, might whittle a stick.

Ceremonial Deposits

Small pottery vessels. The eight little specimens (Figs. 55e; 65b Appendix IV) found in the sealed wall niche of Kiva 7 can safely be considered cult objects, not only on account of what the Germans would call their Fundort, but also because they resemble so closely a number of similar small pots from Pecos that had been carefully buried or otherwise concealed. In addition, many of the latter were accompanied by specimens that can hardly have been other than ceremonial. All these have intrinsic interest, but it would also be important to know how and why they came to be where they were found. I believe that when more data are at hand as to other sites occupied during the Colonial period, this matter may prove to have significant historical as well as ethnological bearings, for the nature and the manner of disposal of such materials may well throw light on the attitude of the Spanish priests toward native Pueblo religion and on Pueblo reaction to attempts to do away with age-long ritual practices.

Most of the little pots recovered in former years came from our limited excavations between Kivas 6 and 12 (Fig. 20). They were in holes 20-24 inches deep sunk into the living surface of the plaza, which being hard-packed made it possible to see that they had been dug separately and were no larger than necessary. Three other pots of the same size and shape occurred in individual shallow pits near Kiva 15, south of the Quadrangle; another was in a subfloor repository in Kiva 16. The entire lot has been illustrated and proveniences recorded (Kidder and Shepard 1936:278-86, Figs. 239-46). Although I feel sure that all were buried at about the same time, they run practically the entire gamut of Pecos wares from Black-on-white to Glaze V. None is Modern Painted, the only small two-handled example of that ware (*idem*: Fig. 244i) being from an accumulation of ceremonial material in Room 30, crushed, probably in the late 1700s, by a falling wall (Kidder 1924:26). Because of the lack of that pottery I believe the other little pots from the plaza and elsewhere were deposited prior to 1680, probably well before.

The vessels in question are nearly all less than 4 inches high. With few exceptions, they have a pair of tiny handles or two opposite holes in the rim. They were thus obviously meant to be suspended and I have been told that a set of similar two-handled pieces was recently obtained at a Tewa pueblo on the Rio Grande, where a native informant said they were filled with water and hung from a large image of the "water serpent," which was carried through the town ceremonially. Stanley Stubbs collected a single one at Jemez. At the ruins of Pueblo Blanco in the Galisteo Basin, Nelson found eight little pots of the same sort, with an anthropomorphic stone idol, concretions, and petrified wood (1914: Fig. 12).

That such vessels had long been in use in the Pecos country, and probably in other parts of the upper Rio Grande, is suggested by the presence of so many Black-on-white examples. Some of these, it is true,

have an archaistic look, but others seem not to be imitations. A further indication of the antiquity of this form and of its ceremonial function was provided by one of typical shape and Black-on-white ware from below the floor of Room 80 at Forked Lightning (Fig. 5c, d, e). It had been packed about with what appeared to have been grass, the mouth closely covered with a flat bit of stone. It held a bunch of small rotted feathers with shell and turquoise beads and pendants (listed in Kidder 1932:110). None, however, was found at the Black-on-white pueblo of Pindi, unless a single specimen figured by Stubbs and Stallings (1953:Fig. 36b) should so be considered. It seems too small for use as a canteen. Stubbs' identifications of the ware of Kiva 7 pieces are given in Appendix IV, which contains further data on small vessels of this sort.

Stone slabs, perforated or painted. Of the small Pecos vessels, a group of six was accompanied by three round perforated slabs like that above the jar in the sipapu of Kiva 7 (Fig. 55a). There were also two lots of five, each with a single slab of the same kind. Near the surface in the fill of Kiva 12 was a lone slab with a larger central perforation (Kidder 1932:Fig. 74a).

Piled on each other in a neatly prepared hole in the plaza were three pieces of a large, unperforated slab bearing the painted representation of a deity or masked impersonator (idem:Fig. 73); several bits were missing. A little undecorated vessel was with it. In the fill of Kiva 6, just inside the east wall and, like all the foregoing near the plaza's surface, were the nine fragments of a second painted slab, the design geometric (idem:Fig. 72). Some of the pieces were mere splinters, but all had been gathered carefully together and piled, the smaller on the larger, across the mouth of a Glaze I Red olla, cracked but complete. Its base was not heavily worn, in spite of its service, presumably in ceremonies, for at least two centuries. Painted stone slabs were found at Awatovi; these and similar slabs from other Pueblo ruins are discussed by Watson Smith (1952:261-270).

Sealed niches in Kiva 7 contained two lots of small stones undoubtedly ceremonial, that are to be described by Bruce Ellis, their finder, in El Palacio.

Idols and ceremonial stones. Another sealed niche holding a ceremonial deposit without pottery was in Kiva 5. The stone slab that closed it was covered by the wall's adobe finish and plaster. The small stone idol it contained (Kidder 1932:Fig. 65b) seems to have been in an unfinished state when hidden away. With it were three of the stones, water-worn to odd shapes, that were often associated with other ceremonial objects. These have been described, their occurrences listed, and characteristic lots illustrated (idem:104, Figs. 63, 80). In the Kiva 5 niche were also the tip of a stalactite and a lump of quartz.

The other three stone idols found during the Andover excavations had, like the two painted slabs, suffered cruelly (idem:Fig. 63). The head of one had been knocked off, its body sadly battered. The features of the second had been almost completely destroyed. The third, origi-

nally much the finest (*idem*: Figs. 63, 64) had not undergone such ferocious iconoclasm, but it had been broken into three pieces and several small bits were missing.

The headless idol was in a slab and masonry bin in the corner of the plaza-fronting Room 55 (Fig. 24). With it were 23 of the water-worn stones, three pieces of petrified wood, and a hematite nodule. All had been smeared with red ochre. Well down among the stones was a fragment of china. The other two idols were together in a slab cist high up in the fill of Kiva 12 (Fig. 36), with the usual stones (*idem*: Fig. 62). On the finer one, much care had been lavished; its three parts had, without much question, been glued together and the whole figure, including the raw surfaces where the few pieces were missing, painted red.

The fifth idol came from a bin in a room of the South Pueblo excavated in 1939 for the Museum of New Mexico by the late William Witkind. It has been described and its possible significance interestingly discussed by Marjorie Lambert (1957). Another bin was against the east wall of a room, just north of Room B-IV (Fig. 21). Of masonry, and set on the slabbed floor, each of its three low walls was topped, like those of the slab cist in Guardhouse Kiva I (Fig. 62g), with wood, squared 2- by 4-inch pieces of cedar. Packed into it were 62 of the waterworn stones and a piece of fibrolite sawed half through in order to break off a part (Kidder 1932:105, Fig. 70f; the same page and figure deal with our few other pieces of fibrolite, a handsome satiny stone apparently used only for ceremonial purposes). All these objects were ocher-smeared.

It seems certain that most, if not all, the above-listed deposits were made to conceal objects sacred to the Indians, but anathema to the missionary Franciscans. Some, such as the idol plastered over in the wall of Kiva 5, the little pots and the stones in the Kiva 7 niches, the single pot and the strangely-shaped stone wrapped with a string of *Olivellas* from the underfloor repositories in Kiva 16, might be thought to have been cached in fulfillment of a rite. Again, there is the possibility that certain of the deposits consisted of paraphernalia or of fetishes belonging to religious groups that had died out as Pecos shrank, or were about to become extinct.

In the latter connection, it should be noted that E. L. Hewett, who early in the 1900's lived in the upper Pecos valley and who was a friend of the Pecos survivors at Jemez, once told me that they had told him of a cache of cult paraphernalia left behind at the time of the exodus. Of this he has written, "The Pecos Indians still make pilgrimages to their ancestral home. The last occurred seven years ago (1897), and the writer has a letter from them dated October, 1903, stating that the Pecos Indians wish to visit the old pueblo in August of this year and asking the writer if he can secure them from molestation when they go to visit and open their sacred cave. I do not know the exact location of this cave." In an addendum Hewett says that he has heard from the Pecos that they made the pilgrimage to their ancestral home in August and on opening the cave "found everything all right." (Hewett 1904:437, 439).

The foregoing implies that the Pecos used to visit the ruins of the pueblo as well as the cave. Of this I found evidence in 1915 in the form of a zigzag wooden "lightning arrow" and a little bow, under overhanging rocks below a circle of rough stones on a rise of the mesilla north of the ruin. This I took to be a shrine and that the Indians could not have been there long before was evident from the perfect preservation of the two, both of which lay on the surface (Kidder 1932:293-94; Fig. 241a).

As to the existence of a deposit of sacred objects in a cave, there seems to be no doubt. In 1925, two of my party found a very deep cave in the hills. They reported that they penetrated a narrow passage with gangliar chambers for, they believed, nearly a mile, to where it was blocked, apparently artificially. No objects were seen on the clay floor, but the roof, from which hung stalactites, was smoked clear to the end. A Mexican who lived near its entrance told them that the Indians came to the cave every five years; that they had been there the year before; that they remained inside for several days; and that only half as many emerged as entered. This last is in line with the type of story the local Mexicans often tell of the Indians. I have also heard it said that nine go in and only eight reappear.

To return to the little pots, I am convinced that pressure by the resident Spanish priest, whose orders could probably have been backed if necessary by force, led to their burial and to the smashing of the painted slabs and the idols. One can imagine the people's pain and fear at seeing violated or, even worse, at being coerced themselves to mishandle things so long revered, objects that from time out of mind had brought the life-giving rain to their crops, had cured sickness, vouchsafed good fortune and order to the community. One pictures the stealthy return of devotees to the scene of such desecrations, to recover the pitifully injured idols, to gather the bits of the slabs. In secret, too, must have been their burial. It is also not hard to understand why the little pots and the round perforated slabs, which on the evidence of Kiva 7's niche and elaborate sipapu were evidently of great ritual significance, had been taken from other kivas and consigned to Mother Earth, out of whose depths when the world was young and through the first of all sipapus, the Old Ones, the ancestral beings, had struggled upward into the light of day.

Pipes

At Pecos, some ceremonial role was also played by pipes, or at least by certain ones. Of this we can be sure, not only because of their known ritual use at other Pueblos (Parsons 1939:passim), but also because of the evident connection of some with kivas. For instance, we found a set of six in a little pocket plastered in behind the wooden palings that lined Guardhouse Kiva H, and four in Guardhouse Kiva I that had without much doubt been cached in a pocket in the now fallen upper part of the wall. These pipes were of normal length (3 1/4-3 1/2 inches) and

two others came to light in the above-mentioned pits containing kiva ash. A third pipe was in the ash repository of Kiva 4. All were of Class II B 4, *i. e.*, body rectangular in section (Kidder 1932: Fig. 137f-h). A few found loose among fallen building stones in ruined rooms may well have been in wall-pockets. None of this type was in a grave.

A group of much larger pipes all came from rooms. Of four in Room 19, three were again of Class II B 4 (*idem*: Fig. 147j, k, l), the other a large tubular pipe on which stood two little animal figurines (*idem*: Fig. 153). A single very fine specimen of Class II B 2 was in Room 40; two large tubulars were with other ceremonial material buried by a falling wall in Room 30 (*idem*: Figs. 154a, d, f).

Most, probably all, the above pipes were deposited after 1600, how much after is questionable. I am also uncertain as to whether or not they were being hidden from the padre. Those in kiva ash would seem surely to have been placed there in fulfillment of a rite. The same may have been true of those in kiva or room wall pockets.

There is no question that certain of the deposits were made after the Spanish colonization of New Mexico in 1598. The damaged idol in Room 55, for example, had among the waterworn stones that accompanied it a sherd of European china. Sherds of china also came from the fill of Kiva 12, either below or at the level of the cist that held the damaged idols (on the depth of these fragments my notes, unfortunately, are not clear). In any case, the idols in Kiva 12 were interred during Glaze V, a group of broken bowls made early in that phase having been found on the bottom of the chamber. The little pots and perforated stones from the plaza could not accurately be placed, but some of the vessels seem pretty surely Glaze V. Finally, the ceremonial deposits under Kiva 16's floor were made during or after Glaze V, as there was a sherd of that ware in the masonry of the kiva wall.

The Church versus Paganism: The Pueblo Revolt

Oñate, the colonizer, visited Pecos and received the submission of its people in July, 1598. Just when the first resident priest was installed is a question, but it was probably not very much later. It is certain that to such devoted missionaries as must he and the other early Franciscans have been, the pagan rites of the Indians would have seemed veritable works of the Devil. As soon, therefore, as the Pecos priest felt his hold to be sufficiently strong, it can hardly be doubted that he set about their suppression. The first point of attack might well have been the kivas. It may be that we found evidence of this.

It should be recalled that no less than five: Kivas 2, 8, 11, 15, 17 had been filled with refuse that I noted as Glaze IV. This ware I have believed to have been changing into Glaze V about 1600, in other words close to the time of Oñate's colonization of New Mexico and his appointment of priests to Christianize the Pueblos. Thus, it is conceivable that under

Spanish coercion those kivas, and possibly all others in the town, had been put out of commission and made to serve as dumps.

Most unfortunately that problem, like many others that have arisen during the writing of this paper, was not thought of when I was working at Pecos. For this reason no special attention, beyond noting their supposed phase, was given the sherds from the kivas in question. Nevertheless, I believe that the bulk of the pottery in them was indeed what I had named Glaze IV and set apart, on the basis of certain criteria of form of bowl rim and color of slip, from Glazes III and V. But the transition into the latter was so gradual that no sharp dividing line could be drawn (this is discussed at length in Kidder and Shepard 1936; concrete exemplification in Figs. 141, 143, 186).

If, indeed, the kivas were filled with refuse during the early 1600's, most of the material might actually have been "my" Glaze IV. There should have been plenty of it at hand on the surface. At the same time there might have been a considerable number of sherds of the IV-V transition. These could easily have passed as examples of IV. Fortunately, no one of that lot of kivas was completely emptied. Thus, their fill can still be studied and the matter tested, as was done in the case of Kiva 8 by Stanley Stubbs, who has spent so much time wrestling with my problems. Kiva 8, at my request, he cleared, and reports that although many Glaze I Yellow and II sherds were in the fill on the floor, there were late sherds clear to the bottom (letter of September 4, 1956).

To return to the problem of coerced abandonment and filling of kivas, it does not seem likely that only certain ones would be condemned. On the other hand, Kiva 5 appeared to have been continuously in use from Black-on-white times until the exodus to Jemez. However, enforced dump could have been cleared out and the chamber reroofed, once the hated Spaniards had been expelled in 1680. Proscribed kivas elsewhere seem usually to have been burned, yet no kiva at Pecos save No. 7 in its first state, had been put to the torch.

It is evident that the successful uprising of 1680 was due more to religious than to civil persecution. Certain governors were hard and avaricious taskmasters (Scholes, 1942); the Spanish encomenderos could not have been other than disliked. But attempts to suppress pagan rites were doubtless deeply resented by the whole native community, and especially infuriating to their priests. Modern ethnological studies have shown how powerful, even today, is the Pueblo religious hierarchy.

The latter part of the seventeenth century had been a trying time for Indians and Spanish alike. In 1670, there was a severe famine, followed the next year by a pestilence that carried off both human beings and cattle. In 1672, there were fierce Apache inroads. Things went from bad to worse at all the Pueblos. The Indians continued, or perhaps reverted openly, to their "superstitious practices." By 1675 these "reached such alarming extremes that Governor Treviño determined to stamp them out for good. Having captured forty-seven medicine men, who were alleged to be guilty of sorcery and witchcraft, he hanged three of them and in-

flicted severe punishment upon the others, among whom was a certain native named Popé" (Hackett and Shelby 1942:xxii).

This Popé, the ringleader of the Revolt, was a Tewa of San Juan, where he returned after his release. Persecution, however, by the maestre de campo, Francisco Xavier, said to have been a burner of kivas, drove him to Taos, where following the directions of three infernal spirits who visited him in a kiva, the final plans were made.

This is not the place to recount the terrible events of the uprising, which resulted in the slaughter of so many civilians, no less than twenty-one priests, and the driving from the Pueblo country of every Spanish survivor. Its causes and its course are best described by Hackett (1942: passim). Suffice it to say that no man, woman or child who fell into Indian hands was spared, but the greatest fury was against the clergy and everything they represented, the fiercest and foulest desecration having fallen on the churches and all sacred objects.

Governor Otermín and the Spanish of Santa Fe, together with such refugees as could join them, held out for a few days. They were closely besieged by the Tano and the Pecos, soon reinforced by Tewa and warriors from Taos and Picuris. The cutting off of their water supply shortly compelled the evacuation of the town. The Indians, having already suffered severe losses and, I suspect, lacking unity as well as competent leadership, offered no resistance then or during the long and painful retreat down the Rio Grande to El Paso.

Otermín attempted in the early winter of 1682 to reconquer the lost province. He got no farther than Cochiti and his futile effort is only of interest in the present connection as showing how thoroughly, in those few months of freedom from priestly control, the Pueblos had brought paganism back into the open.

Popé and other "sorcerors" had gone from town to town, seeing to it, "that they at once erected and rebuilt their houses of idolatry which they call estufas, and made very ugly masks in imitation of the devil in order to dance the dance of the cacina." Church timbers were to be used for roofing kivas, heads washed "to take away the water of baptism," all Catholic marriages were anullable at will.

When Otermín returned he found already installed in a kiva at Alameda, "idols, masks, figures of the devil, herbs, feathers." At Puaray were two "new estufas" with similar idolatrous contents. The same at Sandia and Santo Domingo. At San Felipe in the center of the plaza were, "piles of stones where the Indians performed their rites"; and at Santo Domingo beside the pueblo was another, "where they make their offerings to the devil" (Hackett 1916:67, 83). A kiva at Isleta, which "had been built in the main plaza" was, like all the foregoing, burned along with its contents (Hackett 1942; see also Bancroft 1889).

After this long, but necessary, digression, we may return to the still open question of when the kivas filled with Glaze IV and perhaps transitional IV-V rubbish were abandoned. I can find no evidence in the literature as to whether or not kivas had been allowed to be in use at

Pecos during the seventeenth century. That in many other towns some, perhaps, in certain Pueblos, all kivas had been done away with before 1680 is shown by the many above-mentioned references to the rebuilding and restocking of estufas found by Otermín in 1682 with idols and masks. But all had not been destroyed in every village because, as we have seen, Popé planned the Revolt in one at Taos. Also, the burning of kivas by Francisco Xavier, presumably at San Juan, evidently took place only on the verge of the uprising.

Should it prove that Kivas 2, 8, 11, 13, 17 were filled prior to the early 1600's and therefore not as a result of Spanish pressure, we shall be faced by the problem of what led to the almost simultaneous giving up of so many ceremonial rooms. No one of these, be it noted, was burned. Kiva 7, however, was. This, to my mind, certainly occurred before 1680, as an original burned floor was overlaid by one of adobes of exactly the same size and color as, and without much question taken from, a pre-Revolt church. (For these floors see description of Kiva 7 and Figs. 52-55; the church in question is discussed in Appendix III.) The burning of Kiva 7 was evidently deliberate rather than part of a general conflagration, for none of the living rooms in closely adjacent parts of the Quadrangle showed any sign of fire. And although conceivably, but I think most improbably, an accidental fire might have broken out in, and even spread from, a pueblo living room, no such thing, I am convinced, could possibly happen in a kiva.

There follows a tentative reconstruction based on the foregoing. The Pecos were forced, in the early 1600's, to give up their kivas and fill them with refuse; the completion of the very large Kiva 12 was forbidden; Kiva 7, perhaps because it was particularly prominent ceremonially, was burned. At the same time the painted slabs and the idols were smashed. The little pots and perforated sandstone discs, which the finds in Kiva 7 show to have been kiva paraphernalia, were rescued from condemned kivas and buried.

After the reconquest of the Pueblo country by Diego de Vargas in 1692-6, priests were once more assigned to the towns. They seem to have taken to heart the terrible lesson of 1680 and to have adopted a milder attitude toward native religion. This was evidenced at a junta of military, civil, and missionary authorities held in 1714 to discuss, among other things, how much leeway should be allowed converted Indians in the practice of painting themselves and the wearing of skin caps. Governor Flores and his officers, with some of the priests, were in favor of forbidding these and other pagan practices, but the majority of the padres held that they were objectionable only in connection with "superstitious" rites and that these could most effectively be done away with if combatted gradually by Christian teachings. In the same year, however, the governor ordered that a new kiva at Pecos be suppressed (Bancroft 1889:232).

There is no evidence that priestly attack on the kivas led, at Pecos, to clandestine ceremonial use of chambers in the house-blocks. I have

wondered, however, if similar persecution at other Pueblos might not have resulted in the giving up of underground kivas. Rooms in the living quarters would be less obvious than kivas blatantly exposed in the plazas, which not only served for secret rites but also were sunk toward the infernal regions. They must, therefore, certainly have housed worship of the devil. The present day house kivas of such towns as Jemez, Acoma, and Zúñi are of course evident enough, for under the now tolerant attitude of the Church there is no need for secrecy. As far as I know, the Pueblos where these now exist all possessed, at the time of the conquest, conventional round or rectangular subsurface kivas. Acoma, although its rocky site might have prevented the putting of a kiva entirely underground, must, I think, have had the type of ceremonial chamber which the Spanish had seen at other towns, for Villagr , who was there with O ate, speaks (1933:167) of an "estufa," a term I think it unlikely he would have used for a room in a house block.

MATERIAL ASPECTS OF KIVAS

Kivas in General

My treatment of all the Pecos Valley kivas has been purely factual. One can do very little more than speculate as to the exact manner of their use, because there exist only the slightest references to those of Pecos by the very few Americans who were there before 1838, while Spanish writers, mostly ecclesiastical, usually spoke of them only as dens for superstitious rites. Nor is it safe to draw definite inferences from what has so far been learned of present day kiva cults, especially at the fiercely reticent eastern towns. This has been made clear by Parsons, who through diligent firsthand research at almost all Pueblos and exhaustive study of the literature, acquired a vast store of knowledge regarding all nonmaterial aspects of Pueblo ceremonial life. She has said in her remarkable work on Pueblo religion (1939:10) that although kivas exist in all towns, their use varies widely. In a footnote she adds, "The kiva neither presupposes nor determines any type of [religious] organization." Nevertheless, as religion has played and still plays such an important role in Pueblo life, with so much ritual and ceremony centering in the kivas, I am sure that intensive archaeological research on kivas, even if at first only in the library, would surely provide valuable information on Pueblo history both social and ceremonial. It should also serve to define problems and point out areas where excavation is most sorely needed. I had hoped to begin this myself and to include in the present paper the results of such a general study. But I soon found this to be beyond my resources of time and strength.

The only studies of the above sort that have been made are P. S. Martin's (n.d.) and P. Reiter's (n.d.) doctoral dissertations and T. L. Smiley's (n.d.) master's thesis. Unfortunately, these have not been published. I have had opportunity to read only that of Reiter. Naturally, its strongest section is on Jemez kivas; to this I often refer herein. The work also contains an extremely useful discussion of the possible derivation from northeastern Asia of the Southwestern pithouse. The most valuable published writings on the genesis and evolution of the Anasazi kiva are those of Brew, Martin, Morris, and Roberts--titles included in the present bibliography although none is directly concerned with the Upper Rio Grande.

To return to the latter area, everything that is at present known of its archaeology is admirably synthesized and thoroughly documented by Wendorf and Reed in "An Alternative Reconstruction of Northern Rio Grande Prehistory" (1955). As nothing of importance can be added to this until more excavation has been done, I confine myself to classification of the kivas of the Upper Pecos Valley and discussion of their orientation, construction, and those specialized parts which serve so clearly to distinguish them from living rooms.

Classification, Forked Lightning, Pecos

I. Aboveground	10
A. Early	5
1. Corner, Forked Lightning	3
2. Square, Forked Lightning	2
B. Late, Round Kiva 4, Pecos	1
C. Very late, Square, Pecos Guardhouse	4
II. Subsurface, round	23
A. Early, Forked Lightning	2
B. Later, Pecos	21
Total more or less examined	33

Placement of kivas. The aboveground kivas, both the Forked Lightning corner and square varieties and the square guardhouse kivas of Pecos, are alike in being integral parts of their respective pueblos. Subsurface kivas, all round, stood clear of the living rooms.

I could not be certain whether Forked Lightning's two subsurface kivas were older than those of its square and corner types. I feel quite sure that the small, deep, Round Kiva D was older than the square and corner kivas of the East Pueblo, but there may well be examples somewhere at the site of the latter two sorts that were synchronous with, or even older than, D. I could not place Round Kiva A in relation to any other structure.

Pindi's three round subsurface Kivas B, C, D were demonstrably older than E, F, aboveground and of corner type. They had, indeed, been abandoned and filled before the corner kivas were built, F actually overlying part of B (Stubbs and Stallings, 1953, plan). No large square kivas were found at Pindi. Whether or not the Pindi "specialized" rooms, small squarish chambers with certain kiva-like fittings (*idem*:31, Figs. 24-28) were functionally related to Square Kivas 1 and 2 of Forked Lightning is unknown. However, in addition to their small size, they differed in being completely hedged in by living rooms, whereas Square Kiva 1 opened on an area free of buildings, as originally did No. 2.

Wendorf and Reed, in their summary of present knowledge of Upper Rio Grande archaeology, show that round, subsurface kivas existed in the western part of that area before either Pindi or Forked Lightning was founded. They believe that the round subsurface kiva was temporarily superceded by the corner kiva, as appears to have been true at Pindi, and (see also Reed 1949:175) that the square kiva was introduced still later from the west along with glaze-decorated red pottery (Glaze I).

The problem of the chronological and cultural relationships of these ceremonial chambers is obviously important. As Wendorf and Reed say, its solution depends on the acquirement of far more data than are at present available. When they wrote, the excavations at Forked Lightning had not been published. At that site, Square Kivas 1 and 2 had been built long before the abovementioned glaze-on-red ware came into use in the

northern Rio Grande, and they formed part of the same structure as did corner kivas (e.g., the East Pueblo). Western influence, however, was already being felt, witness the abundance at Forked Lightning of St. Johns Polychrome and even a very early glaze-decorated form of St. Johns (proto-Pinedale ?). The western contacts that brought this about might also have been responsible for the square kivas. But did square, or even rectangular, aboveground kivas exist in the St. Johns or Zuñi areas at that time?

I have a suspicion, but no clear evidence, that the round subsurface kiva, so essential a feature of Upper Rio Grande ceremonial life in both pre-Forked Lightning-Pindi and in later times, probably persisted somewhere nearby without a break throughout all the local Black-on-white phases. Such kivas were found by Stubbs at Pojoaque (LA:835), less than 20 miles in an air line from Pecos: one of perhaps later date, but still during Black-on-white, was found by Hibben (1937) at the Riana site in the Chama drainage (LA:920) about 60 miles from Pecos, as flies that tireless bird, the crow, much more by land travel. The Forked Lightning Round Kiva A, although I was unable to place it chronologically, had been dug through a stratum of refuse and therefore postdated at least some part of the site. And it had not been used, as had Round Kiva D and the round subsurface kivas at Pindi, as a rubbish dump. As we have seen, there were three round preglaze examples at Pecos (Kivas 5, 6, 10). It seems to me possible that chambers of this sort may even have been present in the later preglaze years of Pindi, for in Upper Rio Grande towns, unlike those of the same general period in sites of the Chaco and Mesa Verde cultures, the round kiva was not, so far as I know, customarily built among, or often immediately adjacent to, living rooms, and so at Pindi examples might have existed beyond the zone of excavation. Furthermore, a considerable part of that site had been carried away by the Santa Fe River. The round kiva that came nearest of any I know to being incorporated among living rooms is the late Black-on-white example of coursed adobe of the Llano ruin in the Taos Valley (Jeançon 1929: Fig. 2, Pls. 5, 6).

If, however, there actually was an interval when round subsurface kivas went out of fashion at Pindi and Forked Lightning, it would be important to learn how long the hiatus lasted and how great an area was involved. Even more interesting, but presumably beyond hope of finding out, would be knowledge of what caused the return to the older type. Local conservatives saying, "we told you so" after bad crop years or other calamities? Influence from communities that had stuck to the older form?

One of the many things I wish I had done in the Pecos Valley was to search for kivas at the Rowe ruin, which was occupied until close to the very end of Black-on-white times when Glaze I Red was just beginning to appear. Even more do I wish that at Forked Lightning I had dug more thoroughly in parts of that rambling ruin that were later than the East Pueblo and nearby structures west of it. I am sure that more recent room groups and kivas must exist, because all the kivas of the East Pueb-

lo had been abandoned and their ventilators plugged, save possibly that of Square Kiva 1, whose east wall was badly damaged by a cloud-burst (Figs. 10, 13c). The ventilator of Corner Kiva 5, the only one excavated in the western rooms, was also sealed and a new late floor abutted the plug (Fig. 15). Still farther west, however, were masonry-walled rooms, of which I only excavated two. They had been built over the stubs of adobe walls (Fig. 7c). I think further examination of this or some other undug quarter of Forked Lightning might uncover one or more of that site's latest kivas, much needed to round out the at present very imperfectly understood history of Upper Rio Grande ceremonial structures of the terminal Black-on-white phases. Pecos proper has yielded scanty, mostly negative, data. The considerable amount of digging done in its Black-on-white sections revealed no aboveground square or corner kivas. And of the three round subsurface examples, 6, 5, 10, which we know were built during Black-on-white times, only Kiva 6 was surely abandoned before the end of that phase and so was not mostly destroyed, as was Kiva 10, or like Kiva 5, greatly altered by later users. Kiva 6 differed from those that came after it at Pecos in having multiple ventilators, no ash repository, no deflector, nor any loom-loop holes (Fig. 40). Being the only unaltered representative, there is no telling whether or not it was typical. Pindi Kivas B, C, D, although certainly considerably older, did possess ash pits but, like Pecos Kiva 6, lacked deflector and loom-loop holes.

In the Upper Pecos Valley, glaze-decorated ware gradually succeeded Black-on-white. It was first obtained in trade from the Galisteo Basin, later crudely imitated locally, eventually produced more successfully as Glaze II. The years during which this was happening, in other words the long and vigorous Glaze I phase, plus Glaze II, constitute a serious gap in our knowledge of kivas of the Pecos area. One cannot doubt that ceremonial chambers of some sort existed there, but I cannot bring myself to believe that the very peculiar aboveground structure at the Arrowhead Ruin (Fig. 18), supposedly of Glaze I, can be typical.

Some of the kivas we excavated that were kept in use into or through later phases may have originated in Glaze I or II, but of that we lack all indication. Indeed, we are faced by a not unlike situation as regards Glaze III, but as has been shown, Kivas 3 and 18 probably, and 21 surely, were sunk during that phase. How long they remained in service we do not know, for none of the three was excavated--another case of pot-headed failure to grasp problems while the work at Pecos was in progress.

I have no data on local kivas to bridge the Glaze I, II, and III gap. Indeed, there has been gathered very little information from anywhere in the Upper Rio Grande regarding anything but the pottery of those phases. Still less has been published. Because of this, Wendorf and Reed have been forced, in making their trait sequence and chronological charts (1955: Figs. 2, 3) to straddle at several places the horizontal line between the Coalition and Classic periods. When adequate information becomes available, there should, I think, be added a Proto Classic. But as knowl-

edge of that proposed period is so scanty, I pass directly to consideration of the makeup of the Pecos Valley kivas.

Construction of Kivas

Size. The two early round kivas of Forked Lightning were small, D being but 11 feet 6 inches in diameter, A, on the basis of the remaining arc, about 17 feet. The only really small kiva found at Pecos, the Black-on-white Kiva 10, had a diameter, estimated from its surviving arc, of 12 feet. All others were considerably larger, running from Kiva 4 at 18 feet 8 inches to Kiva 16, the greatest diameter of which was 25 feet. The average of the ten Pecos examples completely or nearly completely cleared was just over 20 feet. Few were perfectly circular, only one showing a difference of as much as 12 inches between any two diameters (Kiva 16--24 and 25 feet). I have used the 20-foot average for calculating the floor area of the normal Pecos kiva, which was about 314 square feet, a little less if the unusually small Kiva 10 is included. The Pecos figures do not take in the atypical unfinished, or at least unfloored, structure we called Kiva 12. Its two diameters measured 41 and 44 feet. Taking 42.5 as the average diameter, we get for it a square footage of about 1418.

Square Kiva 1 at Forked Lightning, although not exactly square, contained in the neighborhood of 150 square feet; Square Kiva 2, some 121. It is not possible, at least for me, to do more than estimate the square footage of the corner kivas, but Kiva 3, the largest, ran to about 225; Kiva 4 and that at Dick's Ruin ran to 175; while Kiva 5, probably the oldest of its type, ran to not much if any over 150. Of the guardhouse kivas, I, measuring 17 by 18, offered 306 square feet; H, too lopsided for close floor-space determination, approximately 250; J, not allowing for the cut-off corners, 256. Guardhouse Kiva K, assuming that it at first measured about 22 feet each way, had originally some 484 square feet of floor space; its first partial masonry lining reduced this considerably and the final one brought it down to 361 square feet (see Fig. 64).

Orientation. As will be seen, the Pecos were not precisians as regards orientation, *i. e.*, the bearing of the axial line bisecting firepit, ash pit, deflector, and ventilator--elements present in most, the first and last in all, Pecos Valley kivas. This line was evidently, in theory, supposed to be west-east, the ventilator opening through the middle of the east wall. But as to this the Pecos were very lax. On the general plans and the drawings of individual kivas herein, the exact bearing of this line is not indicated, due to my laxity in omitting to record it, save for Kivas 1 (18° N. of E.); 4 (2° S. of E.); 7, 11 (3° N. of E.); 8 (10° N. of E.); 16 (32° S. of E.) all magnetic. This sample shows that exactitude was little considered. The Pecos, had they felt it important, could have faced their kivas with perfect uniformity by selecting as a sighting point some irregularity of the eastern hills, such as the Jemez cacique uses for determining the summer solstice (Parsons 1925:59, Fig. 5).

In my early days at Pecos, I was much puzzled by the eastward facing of its kivas and almost all others of the Upper Rio Grande, because I then believed that the kiva of that region had been taken over, as undoubtedly were certain ceramic traits, from the very potent Anasazi culture of the San Juan drainage, where a south or southeasterly opening for kiva ventilators had been customary.

As a possible explanation of what I considered an extraordinary departure from the conservatism usually inherent in ritual practice, I looked to the Plains, where an eastward orientation had ceremonial significance. This, in addition to the affinity of the Tanoan tongues to Kiowa, led me to wonder if the Pecos and other linguistically allied peoples might not fairly recently have drifted in from the Plains and become so-to-speak Puebloized by influences from the west, but not enough to have lost veneration for the quarter of the sunrise (Kidder and Shepard 1936: 596-97. Hawley 1937: 521 once considered but has since repudiated a similar suggestion). It now seems evident, however, that the round subterranean kiva was developing from the pithouse in country south of the San Juan at more or less the same time that this was happening in the San Juan. The two processes must, I think, have been in some way interlinked, but their chronological and cultural relationships are not yet clear. The important point is that even in those early days there was a directional dichotomy. Data to this effect have kindly been supplied me by W. R. Bullard, who has been making a comparative study of Southwestern pithouses. They show that almost all those of the San Juan Anasazi during Basket Maker III and Pueblo I open south, the exceptions, southeasterly. In the drainage of the Rio Puerco of the West, the southeast was strongly favored, variants opening east. Farther south and east, in the Forestdale, Point of Pines, Pine Lawn, and Mimbres areas, the east leads easily, southeast a poor second, south occurring very rarely. (The publication of Bullard's full data will provide not only considerable new information of his own gathering, but will constitute one of the syntheses on important special aspects of Southwestern culture which, in view of the present great number and wide scattering of factual papers, are so badly needed.)

Thus, a generally eastward orientation for ceremonial chambers was already a settled convention in the country whose people seemingly introduced, or whose influence led to the introduction of, the kiva into the Upper Rio Grande well before there came the heavy influx of influences and probably people from the San Juan in the late 1200's. This, however, did not alter the pattern of Upper Rio Grande kiva construction, as is shown not only in orientation, but also in the lack of an encircling bench, pilasters, cribbed roofing, a deep southern recess, subfloor ventilator, etc., features typical of one form or another of the San Juan kiva.

This matter of the eastward orientation of Upper Rio Grande kivas had always made me doubtful of theories calling for a San Juan origin of the Tanoan peoples. I was accordingly most interested to see that Wendorf and Reed (1955: 158-165) now think it deserving of "serious consideration" that the Tanoans represent a stock resident in the Rio Grande since well before the exodus from the San Juan.

Pit. The excavation for a Pecos Valley subsurface kiva was of sufficient size to accommodate the intended chamber and the stone wall which ringed all kivas except the few, described below, dug in unusually firm deposit. The wall was of unremarkable masonry, only reasonably well faced inside. Places where its rough exterior did not fit snugly against the side of the pit, were filled with adobe, dry and merely tamped down, occasionally kneaded wet, as it was for mortar.

Of the same depth as the pit and extending outward from it for a greater or less distance to the east, was dug a trench for the horizontal passage of the ventilator, and from its end a vertical gouge was cut to accommodate the east side of the intake shaft. Only in the small Round Kiva D at Forked Lightning was the horizontal passage a tunnel; the vertical shaft was presumably sunk from outside to meet it.

Relation of kiva to surface. At Pecos, all round kivas found were subsurface, except Kiva 4 on the North Terrace, where the rock was practically bare. I cannot think of any other prehistoric round example that was entirely aboveground. It was evidently at least a theoretical requirement in pre-Columbian times everywhere in the Southwest that round ceremonial chambers should be sunk as fully as possible below the general living surface, as their pithouse prototypes had been. Hence, for example, the extra labor often undertaken in Mesa Verde caves and some of the great Chaco pueblos to wall kivas about in such a way that material could be filled in around them and so put them technically underground. The requirement persists today, for round kivas, only at Taos and Picuris.

Most prehistoric square or rectangular kivas were likewise subsurface, e.g., Hawikuh (Hodge 1939), Awatovi (Smith 1952), Kuaua (Tichy 1938), and others. Some, like the one at Hawikuh, were built before the coming of the Spaniards but occupied into the historic period. The present-day Hopi alone have clung to the ancient practice. This they often achieved by setting kivas down into great cracks of the mesa edges (Mindeleff 1891). The same keen observer noted (p. 112) that even the room kivas of modern Zuñi are sunk a little below the general ground level.

When Pecos was settled, the first dwellings were built on the most easily defensible part of the mesilla, i.e., the North Terrace and the area to the south that later was covered by the plaza of the Quadrangle. The North Terrace, as we have just seen, had no depth of soil, but against the rocky elevation that rose at the west of the plaza there was probably as much as 12 feet of red clay. This sloped off to the east rather fast, so that only the western part of Kiva 6 could, without great labor, be made completely subsurface (Fig. 40). Such partial sinking, although probably unorthodox, seems not greatly to have worried the Pecos, for some others were far from completely sunk, e.g., Kiva 5, originally built when there was little depth of rubbish--later accumulation seemingly caused the pushing in of its west wall (Fig. 43)--and Kiva 16, much later, but dug into a deposit that quickly shallowed to the east (Fig. 56).

Walls. Walls of all aboveground kivas, both of coursed adobe and of masonry, do not differ in workmanship or thickness from those of adjacent living rooms. The same is true of the corner kivas and specialized rooms at Pindi. The only exception noted in the Pecos Valley is the curved rubble and cobblestone wall of the Dick's Ruin corner kiva (Fig. 17), but it is practically duplicated by one room wall at Forked Lightning (Fig. 7b).

The subsurface kivas show somewhat more variation. The pits for the two at Forked Lightning had been dug into natural deposits firm enough to stand with no more support than a coat of adobe. In D (Fig. 9), this was less than an inch thick; A's wall had been plastered with 4 inches of very hard adobe, so substantially, I presume, because the pit was in gravel.

All the post-Black-on-white kivas were got down into the ground as deeply as might be, most of them into midden. The refuse into which Kiva 11 had been dug was firm enough for the usual masonry wall to be dispensed with. Nevertheless, parts of its pit were lined with slim wooden rods (Fig. 46). Kiva 7 had a masonry wall, but a long arc on its north side was strengthened, apparently against pressure from that direction, by close-set thin cedar rods (8, Fig. 52; 7, Fig. 53c; Fig. 55c). These partial rod linings and the slat lining of Kiva 8, which had been sunk into a firm natural deposit, had served practical ends in preventing slumping of an earthen or midden wall. They were accordingly functional. In the Upper Rio Grande there are other as yet unpublished instances of the functional use of wooden posts or slats to strengthen the sides of pits of Black-on-white and Glaze I kivas. Several Black-on-white examples are at the Pojoaque ruin (LA: 285) and one of the Glaze I phase, appears in a subsurface square kiva in Cedro Canyon (LA: 581). But in the case of Guardhouse Kiva H at Pecos, a slat lining had been backed by a stone wall. Kivas 2 and 13 also had stone walls and slat linings. These two, both in midden, were not completely cleared--still another example of failure to grasp and pursue a problem in the field. But it is probable that both wall and slats encircled each chamber. Were that the case, their linings, as well as that of Guardhouse H, had been nonfunctional and therefore would seem to have fulfilled some ceremonial requirement. If so, several questions arise. Why, for example, were they used only on certain kivas, while others, seemingly contemporaneous, lacked them? Did kivas so equipped serve for special rituals? Did they belong to some particular society or other group? When did the practice reach Pecos? Not, it would seem, in Black-on-white times, as there is no known example there, nor any at Forked Lightning or Pindi. As a matter of fact, granting that Kiva 2 and 13 were nonfunctional examples, we have none older than Glaze IV. However, to repeat, nothing is yet known about Pecos kivas of Glazes I, II, or III. If, as I feel certain, the non-functional wooden lining was not a local invention, from where did it come? And if introduced to Pecos, was it in the so-to-speak "exporting" region a ceremonial retention of ancient wooden walls? However, when

more excavation has been done, it is to be expected that the practice will be found to have been followed elsewhere in the Upper Rio Grande. What its total range may have been has not been worked out. It occurred, N. M. Judd tells me, in Chaco Canyon, where some Pueblo Bonito kivas were lined from the encircling bench upward with slats, hewn boards, or poles, hiding the beautiful Chaco masonry. Judd says that lining of this sort was not used in either of Bonito's two Great Kivas, nor was it in the Great Kiva at Aztec. I cannot remember seeing or finding noted in the literature, a wood lining in any Mesa Verde or Kayenta kiva.

Another type of wall lining, which has not been found at Pecos, might be called wattling or padding. In some cases it is definitely functional, in others it should perhaps be considered nonfunctional. The oldest known example is surely functional. It occurs in the single kiva of Riana (LA:920), a Black-on-white ruin on the Chama. Against its earthen wall were set 4- to 8-inch posts at 3-foot intervals. These ran the full 9-foot height of the chamber and were bound across and across with flexible wythes, the work finished with a coat of adobe, a true wattle-and-daub technique (Hibben 1937).

A not unlike treatment of walls was and still is practiced in the Hopi country. At Shipaulovi, says Mindeleff (1891:126), the north wall and part of the adjoining sides of a kiva built, as were so many of the Hopi, in a crack in the mesa edge, were set with reeds on end, long horizontal rods holding them in place, the whole thickly plastered with mud. This wattling was directly against the rock. Fewkes (1911:31, note a) states that in an Oraibi kiva, "the plastering of the wall is laid on sticks that form a kind of lathing." This was probably the Ponobi kiva, of which Stephen told Mindeleff. The walls of a rectangular kiva at Hawikuh, built, Hodge believed, in prehistoric times but occupied into the historic period, were padded with vegetable materials attached to pegs driven into interstices of the masonry and further secured by horizontal poles, the whole finished with "mud" (Hodge 1939:198, Pl. XI, a).

This wattling or padding, as well as that in older Hopi kivas excavated by Brew at Awatovi, has been thought by Watson Smith (1952:15, 16) perhaps to have served as a more effective backing than rough masonry for the coarse basic coat of adobe that underlaid the finer finishing layers of plaster. If so, it should be considered functional. I consider it doubtful that the practice could have been introduced under Spanish or Mexican influence. A wider range of observations, both geographical and chronological, is needed.

As for finish, the far-from-smooth masonry of the inner side of Pecos kiva walls was brought to a fairly even surface by filling the chinks with adobe. This usually was done while the wall was being laid, although in one or two cases we could see a slight difference in color between such fillings and the original mortar. Then, on the wall was spread and well smoothed a 1/2- to 1 1/2-inch layer of adobe, finer and somewhat harder than the mortar. This, with the plaster it bore, had flaked off from the masonry of most parts of most kiva walls and I think it probably would

have lasted better had the masonry been left rougher than it was. The plaster, apparently calcareous, was said by our workman to be the same as that used by the local Mexicans to whitewash their rooms. It came, they told us, from a few miles downstream. It was often, particularly in late applications both in kivas and living rooms, a pale greenish-white. Applied very thin, the kiva plaster was often renewed. The coats were difficult to count, but on some walls there had been at least 50. In others there were far fewer. Vaillant and I believed that in such cases the adobe base coat had cracked or peeled; the wall had been stripped and done over. The whole finish, base coat and layers, covered not only the wall, but the deflector as well and was run into such niches as were left open and also at least part way into the horizontal passage of the ventilator.

Watson Smith, in his study of the mural paintings of Awatovi, reviews what evidence there is as to the reasons for and the frequency of plaster renewals. As possible causes he lists and discusses, with full documentation: replacement of damaged or fallen plaster, renovation of soiled surfaces, periodical renewals, ritual obliteration of wall paintings (1952: 16-21). He concludes that some Awatovi walls were probably replastered for one or another of all these reasons but he says, "we are still without any reliable measure of the time interval between renovations or the duration of occupancy of any given kiva." The same is true of Pecos except that there could have been, so far as our excavations showed, no obliteration, ritual or otherwise, of mural paintings. In no Pecos kiva was the finish anything like completely preserved, but in almost all, enough patches remained even well up the wall, as well as fallen bits at the base of walls, to make it certain that no such paintings had existed. We did, however, find that coloring of the plaster was practiced, although very rarely. Of the five coats in the Black-on-white phase Kiva 6, the original one was a rather grayish white, with a 2-foot 6-inch bright red dado. Covering this was a rich lemon-yellow coat, very clean. The other three were blackened by soot and dirt. The perfectly unsoiled yellow coat suggests that replastering was not always done at stated intervals. Kiva 11, Glaze IV, was the only other that had had colored plaster. Its wall bore more than a dozen coats, none heavily smoked. One was bright red, one turquoise blue, one light green, others the common greenish-white. My notes fail to record the order of application.

Watson Smith, as a result of his characteristically thorough and painstaking study of Southwestern mural painting in all ages and in all types of structures, concludes (1952: 104) that the art seems to have been in limited practice in the central San Juan drainage as early as Pueblo II; that it gradually spread throughout the Pueblo area; and that its most luxuriant flowering took place during Pueblo IV. Several of the Pecos kivas excavated had been in existence and some were determined to have been abandoned during that stage. The complete absence of symbolic or naturalistic paintings at Pecos therefore seems strange, for the art was then or late in Pueblo III actively being practiced at the Hopi

towns, at Pottery Mound on the Puerco of the East near Los Lunas, New Mexico (information from F. H. Hibben), nearer at hand at Kuaua (Vivian 1935), and probably at the linguistically allied Pueblo of Jemez, where there were paintings on the kiva walls in the mid-nineteenth century (Simpson 1850) and the custom has persisted there to the present (Reagan 1917; Parsons 1925). I of course knew of the Jemez paintings and was naturally on the lookout for similar depictions.

Sipapu. In excavating the Pecos Valley kivas we were always on the lookout for the sipapu. During my apprenticeship in 1907 and 1908 under Hewett and Fewkes I had learned that this small, usually cylindrical, hole in a kiva floor is considered by many present-day Pueblos to represent the opening through which their distant ancestors had emerged from the underworld. Fewkes had also told me that the Hopi, in whose kivas the hole is in a board set in the floor, believe it to provide a pipeline, so to speak, for prayers to reach supernatural spirits potent for bringing rain.

The sipapu in most kivas lies beyond the firepit near the rear wall, in the axial line that bisects ventilator orifice and firepit. Knowing this, we did not fail to examine and remove all layers of floor in the general area in which a sipapu was to be expected. Thus, I do not think we missed this feature, in spite of the danger, stressed by Stubbs, of so doing when, as was often the case elsewhere, a sipapu had been covered by a later floor (Stubbs and Stallings 1953:59). But our search was entirely negative, both at Forked Lightning and at Pecos, as far as the typical sipapu was concerned. Kiva floors of those sites were seldom in good condition, at Forked Lightning often badly torn up by tree roots. However, it was a common practice in other regions to fill with clean sand a sipapu of the cylindrical type that was to be floored over. Even a small patch of sand, such as might have come from a wrecked sipapu could, I think, hardly have been missed in the red-brown adobe of a broken-up kiva floor.

To make up for the seeming absence of conventional sipapus, Kivas 7 and 16 produced much larger holes, properly placed in the axial line. Each contained obviously ceremonial objects. Both, rightly or wrongly called sipapus, have been fully described and their positions shown (Kiva 7: Figs. 52b, 55a, b, 65a; Kiva 16: point 20, Fig. 56). That deposits of this sort, similarly located, were not restricted to Pecos is proved by a find in the large, nearly square, southerly oriented, sub-surface Jemez Kiva A at Nanishagi (Reiter et al: 1940). In its axial line, 3 feet from the north wall, was a plastered-over hole 1 foot square by 2 feet 7 inches deep. Several horizontal slabs were set across it, 2 or 3 inches apart, with adobe between. Then came a slab bearing a Jemez Black-on-white jar, about which were scattered 14 little oddly-shaped, unfired clay objects, bone beads, a bit of turquoise, and other oddments. On the slabbed bottom of the hole was a smaller jar, surrounded by 5 little Black-on-white vessels similar in size and shape to those found in the Pecos Kiva 7 niche (Fig. 65b) and elsewhere.

This type of deposit was seemingly late, as the second floor of Pecos

Kiva 7, in which lay the elaborate sipapu, dates from after 1680, as probably also does Kiva 16. And the undated Nanishagi kiva, with a three-sided deflector and loom-loop holders, was certainly not early.

Loom-loop Holders. These were described at some length as they appeared in the floors of Kivas 1, 4, and 5, and shown as well in situ (Figs. 44d; 50c-e). In addition there are photographs of one dug from among the many in Kiva 1 (Fig. 65e).

The function of the loops is made clear in Amsden's work on Navaho weaving (1934:Figs. 5, 6 and Pl. 17), the Navaho loom being doubtless closely similar, if not identical, to that of the Pueblos. Amsden's description and illustrations show that the loops served to anchor a wooden rod, the lowermost element of the vertical loom. A cord extended lengthwise of the rod, and about this cord, the lower ends of the warps were run in and out in order to space them correctly and hold them in position. A second cord attached the latter to the rod, which in turn had to be made fast against the upward pull of the warps. This was accomplished by a third cord rove through the loops and about the rod, the loops themselves being tightly gripped, at Pecos, by the hard-packed ash paste or clay in which they were embedded. The corresponding rod that held and spaced the upper ends of the warps must have been attached to some element of the kiva roof, being kept at the correct height, as weaving progressed, by an arrangement such as is shown in Amsden's Plate 8 and Figure 12.

The loops at Pecos were usually in lines of six, less commonly of seven. They were set at equal distances apart, 8-15 inches in different lines, averaging about 11, the rods varying in length according to the number and spacing of the loops. These measurements suggest that some fabrics might have been as much as 5 feet wide.

Loom-loop holders were not found in any of the kivas at Forked Lightning, the one at Dick's Ruin, those of Pindi or in the Black-on-white phase Kiva 6 at Pecos. There were none in the Glaze I kiva of Arrowhead Ruin and Wendorf tells me that the two of that period which he excavated at Cuyamungé also lack them. And as no Pecos kiva cleared by us had certainly been abandoned during Glaze I, II, or III, we cannot say whether or not loom-loops had come into use at Pecos before Glaze IV, by which time they certainly had. The kivas of the Rito de los Frijoles throw no light on the matter for although several have loom-loops (Hewett 1909a; Hendron 1940) and some may have been built earlier, all that have been reported on were in use well into Glaze IV. Therefore, like the Pecos kivas with loom-loops, they may not have been so equipped until after the opening of that period. Kiva A, one of three at the ruined Jemez Pueblo of Unshagi, had a set on either side of the firepit, one of five units 15 inches apart, the other of six at 10-inch intervals. At Giusewa, also a Jemez site, Kiva Beta possessed two similarly located sets of five. Their dimensions were not available to Reiter, in whose report a photograph appears. It seems to show that the holes had been packed with ash; the fill of those in the Unshagi kiva is not stated. (For

the latter see Reiter 1938, pt. I:60, Figs. 4, 8; Pl. X_b. For the Giusewa kiva, see his Pl. XIII_b). Unfortunately, it was not possible to date the abandonment of these Jemez Valley kivas, Reiter believes that Unshagi A may have been built during or even possibly prior to Glaze II; he thinks that B and C were dug after A had been burned (*idem*, pt. II:171-180). In assigning it so early a date and perhaps also in considering it older than B and C, I think he must have been mistaken, for Kiva A has all the attributes of a relatively late structure--three-sided deflector, loom-loops, and two post holes (*re* these see Pecos Kivas 7, 14). Unshagi Kivas B and C, on the other hand, lacked loom-loops and C had a simple wall deflector (*idem*: Fig. 4). Square Kiva A at Nanishagi, a third Jemez ruin, had two rows of 4 "cup-like depressions," 1 foot apart, 2 inches wide by 1 1/2 deep, each "doubly pierced" for a loop. They appear to have contained, or perhaps lain above, a "pulverized tuff and ash mixture" (Reiter, *et al.* 1940:12).

It often happens during an archaeological investigation that one cannot be sure that a problem to which one finds oneself giving time and thought is really of significance. Preoccupation with the details of an excavation or a mere Teutonic desire to be thorough can easily lead one up blind alleys. The question of when loom-loops first appeared in the Upper Rio Grande is a case in point. It does, however, seem worthy of some consideration because it concerns the source and the time of arrival of one of the traits involved in the still imperfectly understood history of Anasazi culture in that area.

So far as I am aware, there is no reliable record of loom-loop holders earlier than Glaze IV in the Upper Rio Grande. However, data are still pitifully scanty as to the kivas of the earlier Glaze phases. But I think it certain that they were not made there in Black-on-white times. It seems to me unlikely that the device was of local invention--and I am by no means a rabid diffusionist. If not, how did the Pecos and their neighbors learn of them? Not, it is evident, from people of Mesa Verde culture, for none has, to my knowledge, been reported from any one of the scores of Mesa Verde kivas that have carefully been examined. Chaco kivas, too, seem to have lacked them. Yet Chacoan ceramic influences came early into the Upper Rio Grande and, after about 1300, equally strongly from Mesa Verde centers. It seems strange, in view of the apparent absence of any other recognizable diffusion into our area from the Kayenta country, that only from Kayenta sites have loom-loops resembling those of the Upper Rio Grande been noted: Tsegi Canyon, Betatakin (Judd 1930:*passim*); Cave 2 (Guernsey 1931:64, Fig. 23); Marsh Pass, Ruin 8 (Kidder and Guernsey 1919:60, Fig. 24); Laguna Creek, Ruin 7 (*idem*:50, Fig. 22); "The cornfields" (*idem*:70, Fig. 26, not in kiva); Ruin 9 (*idem*:73, Fig. 27); Chinle Valley, Poncho House (Guernsey 1931:53).

The foregoing differ somewhat from Pecos loom-loops. Those, for example, which depended for a firm stance on being packed about with some kneadable substance, were held by adobe rather than ash paste.



e



b



d



a



c

Fig. 65. Kiva and Mission appurtenances: a, vessel of Rowe Black-on-white ware from sipapu, Kiva 7 (see Fig. 55a, b). Height 5 3/4, orifice 4 1/4 inches; b, miniature Black-on-white vessels and shell objects from sealed niche, Kiva 7 (photos of these and a in situ, Fig. 55a, b, f). For Stubbs' ware identifications of a, b, see Appendix IV. c, d, paintings believed to be from Pecos Mission. Photographed in 1920 in collection of Hon. L. Bradford Prince, Santa Fe: c, Cherub, probably finial or end piece of a retablo, according to Fray Angelico Chavez O.F.M.; d, Madonna as Our Lady of the Angels; Fray Angelico considers this most probable for Pecos; e, side and top of ash-paste fill of loom-loop holders, Kiva 1 (see Fig. 50d).

Adobe, however, was probably used at the Pajarito sites, as ash-paste fillings would presumably have been noticed and recorded. Ash paste appears to be in the holders of Kiva Beta at the Jemez Pueblo Giusewa (Reiter 1938:Pl. XIIIb). The most striking difference between the Pecos loops and those of the Kayenta ruins is in the latters' frequent and often very ingenious methods of setting them in stone. Those of one line, for instance, in the kiva of Cave 2, Tsegi, were made by boring into bedrock two oblique holes to meet an inch or so down and leave a little bridge under which the string or braided yucca for a loop could be passed. Kayenta loops were often anchored by a short wooden "deadman," usually set in adobe in a neatly cut oval or round hole in the stone. In one case, at "The Cornfields" the hole was open longitudinally, but undercut laterally to the same amount, so that the stick could be laid into it and then turned at right angles, in which position it would be held by the upward pull of the loom, thus needing no adobe packing (Kidder and Guernsey 1919:Fig. 26). Judd (1930:Fig. 3) illustrates more clearly exactly the same clever device from one of a line at Betatakin; the sticks were packed about with clay. The commoner Betatakin loom anchors were much like those of Pecos--a twig bent on itself and fastened with yucca strips, the loop's top not quite reaching floor level (*idem*:62; Fig. 18). These were set in holes often dug into rock floors. Few parts of any Pecos kiva floor were of stone; the only one with bedrock in the areas in which loom-loops normally occurred was Kiva 11. None was attempted. It would be interesting to learn what was done when kivas, as at Puyé, were sunk into the soft tufa of the Pajarito Plateau.

All in all, it might appear that if use of loom-loops in the Upper Rio Grande was brought about by outside influence, this could most reasonably be attributed to the Kayenta country. But here enters the time element, for the Anasazi had left that region not much, if at all, later than 1300 and we do not yet know whether or not there had been Upper Rio Grande examples at so early a date. Another possible source must therefore be considered, namely the Hopi Pueblos. In their kivas, there is set in the floor a substantial plank into which are cut U-shaped cavities. These hold buckskin or rope loops to anchor the lower bar of the loom (Mindel-eff 1891:132; section of plank, Fig. 31). An added arrangement not recognized at Pecos was used by the Hopi for the preliminary step, important in all weaving, of setting up the warp. This was carried out by installing horizontally a few inches above the kiva floor a pair of rods with one end of each fitted into a small socket in the wall, the other end held in a like socket in a heavy stone block which could be moved nearer to or further from the wall, according to the intended width of the textile. In many, perhaps a majority, of cases both ends of the two rods were set in blocks, when four rather than two were required. But as Woodbury (1954:153-159; Fig. 33) makes clear in his thorough and fully documented discussion of loomblocks, they served and still serve the Hopi for many other purposes: as seats, as surfaces for grinding pigments or sharpening tools, as props for altar frames, etc. Most of Woodbury's specimens

were found in kivas at Awatovi and were of 17th century date, but he quotes from several authorities evidence that they occurred in late Pueblo III at sites along the Mogollon Rim. Because of this he tentatively infers, that the trait originated in the south and spread north to the Hopi. This gets us no further in our search for the source of the Upper Rio Grande lines of loom-loop holders. The Hopi floor-imbedded plank has not been found in Kayenta ruins, nor has it been reported from the Mogollon Rim sites. Furthermore, it appears to have come into use among the Hopi well after the introduction or invention of the loomblock, for Smith does not mention it, nor does it appear in his photographs of Awatovi kivas, which show lines of small holes in the paving, "that may originally have served as a means of fixing pegs to anchor the lower warp beams of upright looms." (Smith 1952:6, Fig. 33). Similar sets of holes were also in the slabbed floor of the rectangular kiva at the Zuni ruin of Hawikuh (Hodge 1939).

Ventilator. This supplied fresh air to all Pecos Valley kivas. In the aboveground corner and square kivas at Forked Lightning, and those of guardhouse type at Pecos, a simple rectangular opening through the wall at floor level sufficed. The subsurface chambers of both sites required a more elaborate apparatus, with whose principal elements--vertical shaft, horizontal passage, in-kiva orifice, deflector--the reader is already familiar from the foregoing descriptions and sectional drawings. Through the shaft and passage, outside air was drawn down and in to replace and aid the upward movement of the fire-heated air and smoke that escaped through the hatchway in the roof.

Before the true function of the shaft and passage had been proved, E. L. Hewett, because of the Pueblo belief that the sipapu represented the opening through which the Ancients mounted from the Underworld, considered, not unreasonably, that the kiva was a Middle World, and that the ventilating system symbolized the way of their further ascent to the light of day. The deflector, he believed an altar, rather than a practical device to check and distribute incoming air, preventing it from blowing directly on the fire. This also--but I, being unprovided with a deflector, cannot check an elderly flow of reminiscence. Besides, I would like to give future Southwesternists a glimpse of J. Walter Fewkes as a human being, instead of a disembodied author of many pioneer studies of the Hopi and of Arizona and Colorado archaeology.

It was my great privilege to be assistant to that kindly, genial scholar--he seemed very old to me in 1908--at Sprucetree House on the Mesa Verde. Sensing my weakness for pottery, he put me in charge of the sherds. He also had me clear Kiva D, and one day, hearing me speak of its deflector as an altar, he said, "You know, I don't think that thing is an altar; and I also don't think that other arrangement is a ceremonial passage. Let's put a roof on this kiva and try to find out what they are for. It would be interesting too, for people to see what use the pilasters were. Would you like to do the job?"

Naturally, I was delighted, particularly as the Sunday before I had

been making drawings of the beautifully preserved cribbed roof supported by the pilasters of a kiva in Square Tower House. The Doctor gave me a couple of men to cut and help me set the beams and in two or three days we made the roof that's still on that kiva. When the place was cleaned up, we piled some dry twigs in the firepit. The Doctor went up the ladder. As soon as I heard him on top, I put a match to the shreds of cedar bark tinder under the wood. For a few minutes smoke filled the kiva, part of it drifting lazily through the hatchway, where I could dimly make out the Doctor's head and his pointed gray beard. As the fire burned more briskly, I began to feel, on my bare sweaty chest, a cool draft from around the deflector. It strengthened, the smoke commenced to clear down below and to pour up the hatchway. Then came the Doctor's voice, "Kidder!" he called between coughs, "It works!" It did, and after more than six centuries a Mesa Verde ventilator had resumed its ancient task.

To resume mine, I should repeat that a trench for the horizontal passage was dug at the same time as the kiva pit. In most cases, we found the passage completely wrecked because the wooden lintel that spanned its in-kiva orifice had always failed. It had had to bear the great weight of six feet or so of kiva wall that rose above it. When it rotted and fell, the masonry it had supported also came down, usually with some from either side, producing a V-shaped gap. In a few cases, the slumping stones formed a natural arch (Kiva 14, Fig. 61a; Kiva 16, Fig. 57c).

The sides of the passage were walled with masonry (Kiva 5, Fig. 43; Kiva 16, Fig. 56) or stone slabs (Kiva 8, Fig. 48; Kiva 14, Fig. 58), once with vertical wooden rods (Kiva 11, Fig. 46). I can find no note of plaster finish, which I think must have run in at least part way. It was always roofed with wood--rods or slats supporting stone slabs (Kiva 16, Fig. 56; Kiva 5, Fig. 43); slats only (Kiva 8, Fig. 48). All such wooden elements were perishable and had carried heavy loads of earth. Their collapse, except for a few in Kiva 8 (Fig. 44b), filled the passage with earth and slabs. The vertical shaft, wherever we were able to observe it, was always lined with masonry. Its inner, *i. e.*, western face, like the arc of wall above the ventilator's in-kiva orifice, had been supported by a wooden lintel and so also fell, choking the east end of the passage with stone. That two such burden-bearing lintels as these were not made of stone, testifies to the kiva-builders' confidence in the lasting strength of cedar. Of the mouth, *i. e.*, upper, end of the vertical shaft we found no trace. In the case of kivas entirely below ground, the shaft was presumably built up only enough to bring its mouth above danger of surface drainage. Such coping or edging of stone as it may have had undoubtedly fell into the shaft when the latter's western masonry sheathing gave way. Kivas, such as 6 and 16, with a considerable part of their eastern side standing clear, were probably provided with a chimney-like intake shaft that rose as high as, or a trifle higher than, the roof. The late J. W. Hendron, who made a careful study of the ventilating system of Rio Grande

kivas, stated (1940) that such elevation is desirable for taking in an adequate supply of air.

The floor of the horizontal passage was normally an extension of the tamped adobe kiva floor. When the original floor had been considerably raised, that of the passage may also have been. My notes are not clear on this point (see Kiva 5, Fig. 42). A feature probably present in all passages except that of the early Kiva 6 was the water-stop (not shown in the drawings of Nos. 1 and 4, both dug when I knew nothing of Pecos kivas). Located just within the passage's in-kiva orifice, it consisted of a pit some 6 inches wide by 8 inches or so deep, its length depending on the width of the passage. At its east or sometimes west edge was set vertically across the passage a thin stone slab a few inches high. This arrangement seems surely designed to prevent such rain water as might fall into the shaft from running along the horizontal passage and out onto the kiva floor. During heavy downpours the mouth of the shaft presumably was covered. The ventilator's orifice, usually badly wrecked, was rectangular, its height sometimes a little lessened by the slab of the water-stop. The orifice in Kivas 6 and 5, originally larger, had been reduced in size, as explained in describing those chambers (see also Figs. 40, 42c).

There appears to have been no provision for closing the orifice with a stone slab (the "damper" of Wendorf 1954:207). This usually early, but I think not traditional, feature was hardly to be expected in kivas as late as those of Pecos, or perhaps even of Forked Lightning, although the slab found standing in front of the orifice of Square Kiva 2 there, might have served that purpose. However, there was no indication that there had existed a sort of adobe frame such as usually was modeled around the orifice to hold the damper.

Deflector. I pass over for the moment, both literally and figuratively, two features of the kiva floor that lay between the horizontal passage's orifice and the deflector. The deflector's practical function has already been made clear. Its nature, in the Pecos Valley kivas examined by us, varied considerably. At Forked Lightning, there was none in the small early Round Kiva D, Corner Kivas 3, 5, and probably Square Kiva 2. Square Kiva 1 had a stone slab deflector, as perhaps did Corner Kiva 4 in which the small slab between firepit and ash repository may have served merely to separate the two (Fig. 14); a similar small slab did so in the kiva at Dick's Ruin (Fig. 17), which had a true deflector of adobe. At Pindi, the early Round Kivas B, C, D lacked the deflector; of the two later kivas, Corner Kiva F had none, although Corner Kiva E was furnished with one of adobe.

At Pecos, Kiva 6, the only early round kiva whose original appurtenances were undisturbed, had had no deflector. Perhaps its four ventilators, with unusually small orifices, did away with the necessity of shielding the fire. All other Pecos subsurface kivas excavated possessed deflectors of a sort not seen in the earlier chambers just discussed. The new form was three-sided and consisted of a north-south masonry wall

8-14 inches thick by some 20-30 inches high. From it extended at right angles two lower wing walls of the same thickness and about half the height. Across these was laid and mortared into position a long stone slab to roof the ash repository, which was enclosed on three sides by the back and wing walls. The entire deflector, including the upper surface of the slab, had been heavily plastered (Fig. 61a-c). These photographs are of Kiva 14's deflector, the best preserved found by us; in most other kivas the slab had fallen and its plaster, along with that on the rest of the deflector, mostly or entirely flaked off.

Ladder pit. The abovementioned floor features between deflector and ventilator orifice are the ladder pit and the landing slabs. The former was present in every late round Pecos kiva examined, except Nos. 1 and 4, which were not thoroughly or understandingly observed, and No. 11 in which such a pit would have had to be cut into bedrock (Fig. 46). On the other hand, I have found no record of one at any other Upper Rio Grande site. Only when well along on the present study did I come to realize the purpose of this pit. For that reason I mistakenly showed, in a tentative reconstruction of Kiva 14 (Fig. 58), the ladder leaning too much to the west, whereas it should have been drawn standing practically vertical (to clear the deflector) or even leaning to the east. It is some consolation to note that Kiva 14's pit had, for some unknown reason, been floored over. But it nevertheless shames me to think that, although I was never able to find prints of the butts of ladder side-poles in the floor between deflector and ventilator, it never occurred to me to search for them in the usually earthy bottom of the pits, in which I now feel sure that traces of them could have been found. As in the case of E. L. Hewett and the ventilating apparatus, I for long attributed ceremonial significance to an essentially practical device.

The pits were about 8 1/2-11 inches deep, 7-11 inches wide, 22-30 inches long; that of Kiva 5 had been reduced from 22 inches in length to 17 by inserting upright slabs at each end; Kiva 8's pit had been shortened in the same way and to approximately the same length.

Once the purpose of the pits had been recognized, I hope correctly, the landing slabs, so named by Wendorf (1953:45), were much easier to understand. They were more or less untrimmed flat pieces of sandstone, that of Kiva 16 was limestone with a vaguely star-shaped natural marking (Amsden 1916). The slabs were of various sizes, always set flush with the floor to which they belonged, *i.e.*, original or secondary. Lying just east of the ladder pit, their purpose of course was to prevent wear of the relatively soft floor by the feet of those using the ladder. No kiva dug by us had been paved. All landing slabs were taken up; no offerings were found under them.

Firepit and Ash Repository. The single feature of the kiva that from earliest times has never been absent is the firepit--the very heart of the ceremonial chamber throughout the millenia of Southwestern history. Its fire warmed and lit the ancestral prekiva pit dwelling, then the protokiva, and every later form of pre-Columbian kiva--round, rectangular, above-

ground or below. It still functions today from its ancient central position in room-kivas from Zuñi to Jemez; in the unique Hopi kivas, built into great cracks of the mesa-edges; in all those of the Rio Grande. Is it a wonder that ash from the kiva firepit had special sacredness and protective potency? Because of this and because a special repository for kiva ash was so often directly connected with the firepit, I describe the two together. The special qualities inherent in the ash and its ultimate disposal have already been discussed.

In the Pecos Valley, the oldest known firepits are those of the Forked Lightning kivas; the oldest of these is probably that of Round Kiva D, a 2-foot, round, strongly fire-reddened, ash-filled pit, with an adobe coping which was omitted on the east side where lay the ashpit (Fig. 9). Like others at Forked Lightning believed to have been ash repositories, the latter pit was entirely unburned and although practically all ash it may have held had been removed, some remained in cracks in its adobe lining.

Of the remaining five Forked Lightning kivas, the firepits of four were almost duplicates of the one just described. Of these, only Corner Kivas 3 and 4 (Figs. 12, 14) had other pits that might have been ash repositories, as did Square Kiva 1 (Fig. 10) and the kiva of Dick's Ruin (Fig. 17). My reluctance to make more positive identifications stems from my recently realized error in failing to recognize as such the ladder pits of the Pecos kivas. Could the Forked Lightning pits in question also have served that purpose? I could find no side-pole impressions in the floor. But if ladders had stood in the pits, they would have been perilously close to the flames. In none of these early kivas were there landing slabs.

To return to the firepits, which comfortably offer no problem of identification, only that of Square Kiva 1 was rectangular, slab lined and floored; likewise rectangular, was the Dick's Ruin firepit, with a slab only on its east side. In each of the two, a flat igneous stone, well smoothed by grinding, was set flush with the floor close to its south edge. Of the six Forked Lightning kivas with round firepits, only Corner Kiva 3 had such a stone.

The closely contemporaneous kivas of Pindi (Stubbs and Stallings 1953:passim) provide interesting comparisons. The firepits of the early subsurface chambers, B, C, D, were also round and coped with adobe. Just east of each one is an ash pit and east of them in B and D are pairs of holes for ladder side-posts. The two corner kivas, E and F, which are later, have square firepits with rounded corners, each partly lined with stone, each with ash pit and ladder holes on the side toward the ventilator. Kiva E has, for the Upper Rio Grande, a very unusual southwest orientation, presumably because its builders felt that the ventilator must open on the plaza (see general plan of Pindi). On the west side of its firepit, which would have been the south side if Kiva E had had a normal easterly orientation, there were set in the floor four smooth, flat stones. Apropos of these, Stubbs remarks that on the "same" [i.e., south, A. V.

K.] side of the firepit in each of the other four Pindi kivas, the raised adobe rim was found broken down. This I believe was caused by pulling out, perhaps for salvage, grinding slabs of fine, probably igneous stone. The firepit of every Pecos round kiva save No. 6, as well as that of Guardhouse Kiva H, had, or gave evidence of having had, such a stone let into the floor at its south side.

At Pecos, the firepits of all kivas, even the early Kiva 6 and the very late ones of guardhouse type, were rectangular, lined with slabs, except for Kiva 6 and the disused and covered early firepits 1 to 4 of Kiva 5 (Fig. 43), floored with slabs. Their long dimension, again excepting that early maverick Kiva 6, was north-south. They were set directly against and across the ends of the deflector's two wings, thus being in immediate contact on the east with the rectangular ash-repository, whose three other sides were the back and wings of the deflector. The repository was occasionally floored with slabs, more often not. Like the firepit, it was always found full of ash, but in no case was there evidence that a fire had ever burned in it.

There can be little doubt that the repositories served as temporary storage places for ash from the kiva firepits. A certain amount of this was from time to time put to ritual use, but evidently not enough to keep up with what was constantly being produced. One supposes that because of its ceremonial distinction it would have been a profanation to cast it on the rubbish heap along with the ash of domestic fires, although even that, as we have seen, has mystic qualities. So kiva ash, when the repository threatened to overflow, was removed and carefully buried. Some of this is more or less guesswork, but backed by various bits of pretty convincing evidence.

The discussion of kiva ash raises the question of what sort of fuel produced it. I know of no recent observation as to this by any ethnologist, but I would not be surprised if there were pertinent data somewhere in the writings of Fewkes or Voth, Hough or Stephen. Victor Mindeleff, however, as always, comes to the rescue. In his invaluable "Tusayan and Cibola," he states (1891:121) that in the dome-like structure built up over the hatchways of Hopi kivas, there were always hung sundry bundles of greasewood, "which burns when dry with a bright, sparkling flame." Castañeda says, "they burn a handful of thyme [sagebrush] at a time" (Winship 1896:520). In the Pecos country something similar would appear to have been used, as the ash of all its kivas is so pure white and so free of charcoal that complete combustion is indicated; furthermore, a bright fire must have been desirable as a source of light.

Floor. Stone paving, very rarely practiced in the living rooms of the Upper Pecos Valley, was not found in any kiva, save for a small oval area at the west side of Kiva 4 (Figs. 49, 50b). The only complete paving of any sort was of Kiva 7's middle floor (Figs. 52b, 54d), in which moldmade adobes, undoubtedly salvaged from the "Lost" Mission, I think after 1680, were used (see Appendix III). As a matter of fact, I have seen no record of stone paving in any Upper Rio Grande kiva, an-

cient or modern. Stanley Stubbs writes me (Oct. 5, 1957) that he knows of none. Castañeda's reference to the practice (Winship 1896:518) I therefore think must refer to the kivas of the Zúñi country where, as in Hopi kivas, it was, in his day, customary.

The floors of Forked Lightning and Pecos kivas were all of adobe. The original floor of any kiva was apparently always laid down subsequent to the coat that evened the masonry of the wall. We noted instances at each site in which the floor turned up a little over that coat to produce, as a rule, a curving "hospital" junction. Then came the application of the first of the often many thin coats of plaster that were spread on the wall and deflector. These layers were relatively soft and so subject to wear that although in the Pecos kiva at least, they probably were habitually run out over the floor, it was usually not possible to make out their number, their finish, or occasionally even their former existence. But when they had practically disappeared, an indication of their thickness was sometimes provided by the slight difference in level of the tops of ash-paste loom-loop holders when several sequent lots had been made close together (Figs. 43g, 50e).

As has been noted in the descriptions of the kivas, several had been refloored two or three times. Such major operations of course involved new applications of evening coats. Certain of the floors were black, well smoothed, and had seemingly been quite resistant to wear. J. A. Jeançon, who was familiar with the method of making earthen floors at the Pueblos of the Upper Rio Grande a half century ago, believed that the black examples he found in ruins of that region had been, "composed of a mixture of ash, grease, very fine charcoal, water, and adobe. This was applied in a semi-liquid condition, which, when partially dry, was beaten down to form a solid mass, which is easily distinguishable from anything else. It is no uncommon sight....to see a woman using the larger polishing stones to polish her dirt floor" (Jeançon 1923:14, 21). Those of Pecos were doubtless made and finished in the same way. Elsewhere, Jeançon (1929:15) speaks of blood being used in the mixture, as does Hendron (1940:29, note 49) quoting Chapman, but this was from slaughtered domestic animals, and although blood from this source might have been available to the 17th and 18th century Pecos, it would of course not have been in earlier times.

At Pecos, the rods or slats of both partial and complete linings, described in the section on kiva walls, were always put in place before the laying of the floor, running down several inches below the level it was to attain. This adobe layer, tamped tightly against their lower ends, held the lining elements firmly in place.

Roofing. Not a single kiva roof remained either at Forked Lightning or Pecos. Nor were any main (primary) roof beams found except the one great log that lay across Kiva 7 (Fig. 32a). Only two or three possible secondary beams came to light. Timbers of a size suitable for these uses required, even after metal axes were introduced, much labor to fell, trim, and carry or drag to the site. Vastly more, of course, when only

stone tools were available. Hence, the beams of all kivas abandoned before 1838 had been salvaged by the Pecos themselves and those that remained had been torn out for reuse by local Mexicans, or chopped up for firewood by freighters on the Santa Fe trail. Nevertheless, postholes and discarded minor roofing materials yielded some information.

All kivas were probably crossed by a central pair of main roof beams. These may have been stouter than others parallel to them, because they bore the added weight of the hatchway frame. Sizeable slabs sometimes found in kiva fill led us to think that hatchways might have incorporated a certain amount of stone. Even if not, no little wood must have been involved in order to provide a firm rest for the ladder (see the Nambé kiva's hatchway, Fig. 68a). There was no evidence of any structure such as the Hopi build on the kiva roof to house the hatchway (Mindeleff 1891:120-121, Pl. XXXVII).

Whether or not to use supports for the roof, seems to have been a matter of judgement as to the ability of the walls to carry weight. At Forked Lightning, for instance, there were no holes for posts in Round Kiva D, which was not only very small and easy to span, but had been dug into a firm natural deposit. Square Kivas 1 and 2, and the corner kiva at Dick's Ruin, all without postholes, had strong walls also braced by abutting structures. In Corner Kiva 3, standing more nearly clear, were three, probably four, postholes. It may be that pairs of posts, set close to the walls, did not support main beams but bore timbers on which main beams rested. In either case, as in Kivas 1 and 6 at Pecos, also provided with four postholes, there was no way of ascertaining the direction (*i.e.*, east-west or north-south) of the main beams, irrespective of whether they had been set directly on pairs of the posts or been carried, as suggested above, on post-supported timbers. We are not in very much better case as regards Kiva 7. North-south across it lay the great log that I have considered a main roof beam. It was directly over two strong posts (Fig. 52 6, 6). But was it a roof beam? As was said in describing the kiva, it was longer than the chamber's diameter. Furthermore, it should not have needed any support and the posts could have been props of east-west beams. But on the other hand, an equally great log is the north-south central roof-beam of the present-day Nambé kiva; it is longer than the kiva's diameter, and has a pair of support posts much like those of Kiva 7, both in size and position (Figs. 66-68). The posts in Kiva 7 date from the laying of its middle floor of adobes, probably in 1680 or shortly after. Not far from that date, one way or the other, Kiva 14 was built. Like Kiva 7 and the also late Guardhouse Kiva I, it had two strong, squared posts that might have been 1680 loot.

Before leaving the difficult and perhaps unimportant problem of roof-beam direction, it should be noted that in Kiva 8 were two round posts, one on either side of the ventilator orifice (Fig. 48 3, 4), that might well have served to keep the weight of east-west beams from bearing down on that kiva's slat-lined, unwalled edge.

As to the size and arrangement of such secondary roofing beams as

the Upper Pecos Valley may have had, nothing is known. Among the "leavings" of roofs that had been pulled off were pine and cedar slats, large slabs of pine bark (this not seen in living room ceilings), and fragments of the puddled adobe layer that covered the roof. Wherever bits of this were found they were about 12 inches thick.

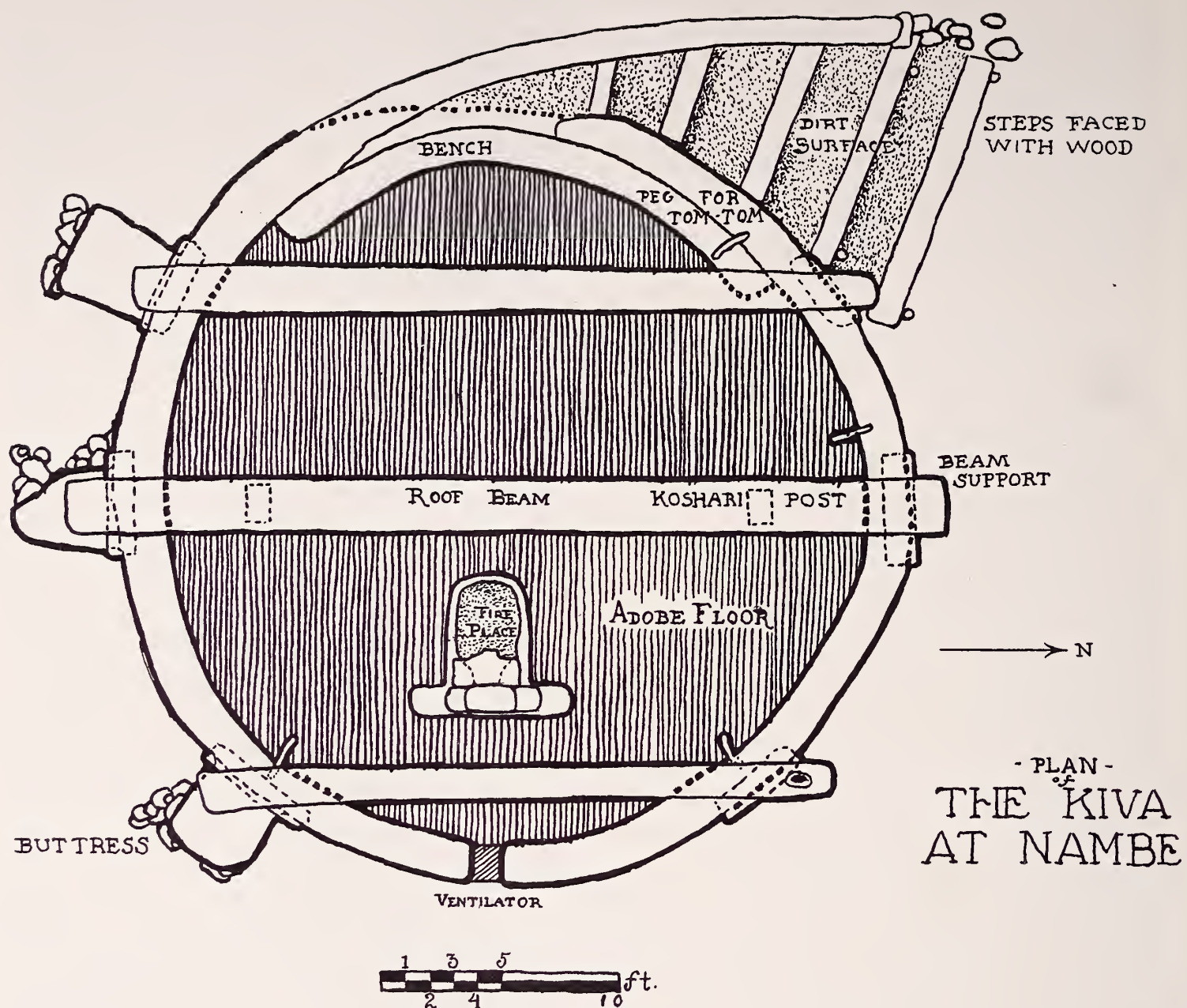


Fig. 66. Kiva at Nambé. Plan by S. P. Moorehead, 1922. Direction arrow approximate.

MODERN KIVAS

An interesting sidelight on the difference in attitude of the Upper Rio Grande Pueblos toward Whites and others is furnished by an incident at Taos recorded by Parsons (1925:xi). She met there a Chinese traveler and one from New England. The former had been most cordially received, invited to stay in the pueblo, and taken into a kiva. No hospitality, rather marked aloofness, was shown to the American; his guide would not even lead him past the kivas. Much puzzled, he asked Dr. Parsons the reason for such cold treatment. She, who knew her Pueblos, told him that it was, for the Taos, the only way of "getting back" at him as a representative of those who looked down on them as inferiors and whose priests had long been interfering with their way of life. Her answer explains part of the difficulty encountered by anthropologists in learning anything of the esoteric practices of the eastern towns. The secretiveness of those Pueblos has notably increased of late and has worked westward to the Hopi, who in the days of Stephen and Fewkes, were quite ready to admit research workers into their kivas when certain ceremonies were in progress. The hostility of some Rio Grande Pueblos can, or not long ago could, be overcome by persons not obviously "snoopers," who had the patience and friendliness to gain their confidence. This was done by Reagan at Jemez and Jeancon at Santa Clara. Most, but not all, present day investigators have found some Pueblos, particularly ultra conservative Santo Domingo, so loath to supply data of any sort that they have had to meet informants away from their towns and in secret.

Much of this, as Parsons told the New Englander, is merely to thwart Americans. But there are certain rites whose efficacy would be lost were they to be observed by anyone, White or uninitiated Indian. Parsons (1936:14), for instance, was told at Taos: "Our ways would lose their power if they were known." It is easy, therefore, to understand why so little has been learned, and less published, as to Rio Grande kivas, their construction and interior fittings. Hence the sketchiness of these notes, almost completely at second hand, for although I have visited all the Pueblos save Acoma and Picuris, I have never asked to enter a kiva.

An invaluable introduction to a thoroughgoing study of today's kivas, which I greatly hope may be made by someone before these chambers lose their importance, are given up, and fall into ruin, is Stanley Stubbs' "Bird's Eye View of the Pueblos" (1950). This admirable little book contains an air photograph of each Pueblo and a plan drawn from the photograph, omitting non-Pueblo structures that have encroached on many eastern towns. A scale and a direction arrow accompany every plan, together with a legend making clear the symbols on the plan that indicate number of stories. Also marked are the Church and the kiva or kivas,

where present, as well as abandoned rooms. There are brief historical sketches and data on location, tribal affiliation, language, period of occupation, type of construction, and population of each Pueblo. Stubbs writes a foreword, a short introduction, and adds a useful bibliography. I know of no more satisfactory example of multum in parvo.

Tiwa Kivas

Taos, the only present-day pueblo surrounded by a wall, has six kivas in active use and a seventh, which now plays no part in the formal kiva organization but, as will be seen, is the place of at least one ceremonial observance. The six "active" kivas constitute two groups of three each: those of the north are all within the town's wall; of the southern kivas, two and the disused kiva are outside the wall, one within (Stubbs 1950:Fig. 4; Parsons 1936:17, 18, and map; for ceremonial role and grouping see her text, passim).

The earliest and only reasonably adequate description of the kivas is by M. L. Miller (1898). In 1896, when he was at Taos, the seventh kiva may not have gone out of regular service, as he groups it with the three others at the south. The kivas of Taos, he says, are round. In his time, they protruded about a foot above the surface and were banked about with earth to give, he believes, the impression of being what Bandelier (1890:268) called "completely subterraneous." Parsons, at Taos in 1922 and 1931, felt that they stood higher out of the ground and tells (1936:17) of, "an elevation of a few feet with steps in the wall. . . ." It seems unlikely, however, that they had been supplied with higher roofs and one wonders if the earth banked about them had not been washed away since Miller's time, for the guarding of the hatchways had not changed at all. This, as described by Miller, differed as between kivas inside and outside the wall. In the three outside at the south, the hatchway with its tall ladder lay in a small square formed on the flat roof by an adobe wall 2 feet or so high, in which a little entrance gap was left. In the four kivas within the wall (one at the south and the cluster of three in its northeast corner), the enclosure of the hatchway was accomplished by a circular palisade with gap, its closely set posts 7 or 8 feet high, tightly lashed together. A good photograph of each sort is supplied by Miller (1898:Pl. opp. p. 24; see also Parsons 1936:Pls. 4-6, 11).

Miller, who entered only one kiva, describes it as just high enough to allow one to stand erect, the roof heavily sooted. The firepit was in the center and there was, "a small hole at one side to secure draft for the fire." The position of this ventilator is not given, nor is there mention of a deflector. On the floor were untanned ox hides and a "big drum." Parsons (idem:Pl. 6A, B) has photographs of two palisaded kivas each of which shows, against a low adobe wall with gap surrounding the palisade, two small adobe structures that must, I think, enclose the upper end of the ventilator's vertical shaft.

The fourth south-side kiva, whose ladder poles are shorter than in any of the others and "look battered," fell into disuse, according to Parsons (idem:5), "with the lapse of war." It's only definitely recorded function is now connected with the annual race between men of the north group of kivas and those of the south group. Very early on the appointed morning, the runners go one at a time into the "disused" kiva to pray to P'achale (Blue Water), evidently a stone image, which is offered corn meal, pollen, and turkey feathers. The image stands between the terraced "firescreen" (deflector) of adobe brick plastered over and a hole covered with buffalo hide, into which each runner deposits his corn meal (idem:96, 97, Fig. 4). The location of the firepit is not given. She also (idem:74, note 1) once saw spruce boughs lying by the hatchway of this kiva indicating that some form of ceremony had been carried on there. And she was told by a visitor from Isleta that it was, "a place of retreat for the boy initiates." Another informant thought that scalps used to be kept in it. This suggests the earlier connection with war implied by its having fallen into disuse with the lapse of that, at Taos, formerly constant preoccupation.

In discussing fetishes and shrines, Parsons mentions two other anthropomorphic stone images, one belonging to north, one to south group people; and a third, which may be P'achale of the disused kiva (idem:103).

I have treated the kivas of Taos at such length because, like those of Pecos, they are numerous, round, and subsurface, whereas no other Tanoan Pueblo save Picuris, of whose kivas practically nothing is known, has more than two, some round, some rectangular, all aboveground. Other similarities between Taos and Pecos, already stressed, are their frontier situations, and their encircling walls. Perhaps, therefore, there may also have been likenesses in social organization and kiva practices. We can have little hope that significant new light will ever be thrown on the non-material aspects of life at Pecos. We do, however, possess a body of data--I wish it were greater--on Pecos architecture and kivas. But our knowledge of the pottery and other artifacts is unusually full. For this reason, studies of those elements of the late prehistoric and early historic culture of Taos are much to be desired.

I shall say no more of modern kivas, beyond a few notes from the literature and some bits of data I have gathered myself.

Picuris, like Taos, is on the northeastern frontier. It seems to be a dying Pueblo. The only published data are by Parsons (1939a) whose information was obtained in 1925, away from the town, from a Picuris youth. She was apparently at Picuris briefly in 1937, the same year that G. L. Trager was there studying the language. He checked some of her notes. Parsons' plan was evidently made from descriptions by her young informant, as it is dated 1925. It was surprisingly accurate, according to Stubbs' air photograph, which shows that there has been much Mexican intrusion (1950:Pl. III).

According to Parsons, there were six kivas, four surviving, two in

ruins. This does not include the "round house [no. 18 of her map] used in connection with races and games." It is only partly below ground. Florence Ellis writes me that it is not considered a kiva and that it was "merely a torreon." All others, Stubbs writes, are almost entirely sub-surface.

Since the foregoing was written, Florence Ellis has sent me the following information supplied her by Bernard Siegal.

"The torreon...on the hill is referred to by these people as their round house and was considered in the past even more sacred than the kivas. It was here that they went to pray for rain and, according to Siegal, this structure, although partly ruined, today still is used for this purpose.

"I think this round house must be comparable to the structure referred to as a 'round house' in Isleta, and utilized for this purpose, and for any ceremonial affairs involving the entire village. This round house is one of the two structures which Parsons refers to as Isleta kivas. As I pointed out in my kiva paper, the round house apparently can be considered a Big Kiva and the second 'kiva' to which she referred is no more than a moiety house, the residence of the head of one of the two moieties. The head of the other moiety likewise uses his living room as a moiety house. This makes two moiety houses and one Big Kiva for Isleta. The society houses in Isleta and some of the other pueblos appear to be small kivas formerly used by religious societies and still being used by the religious societies of Taos and Picuris Pueblos. The round house of Picuris, as Seigal said, often has been erroneously considered a structure for defense, but he checked with some care and got the description which I have listed above."

Sandia and Isleta, southern Tiwa towns, are widely separated from their two northern congeners. They seem to have little relation, other than linguistic, with either Taos or Picuris. Stubbs (1950:Fig. 6) shows for Sandia one rectangular kiva built against a small room, but intimates that others may be in the house blocks. He figures a single free-standing round kiva at Isleta and says, "if specialized rooms used as kivas exist they have not come to our attention."

Towa

Jemez. So far as is known, all kivas of the several late prehistoric Jemez towns were freestanding, round, and subsurface. But no one of these ruins has been thoroughly enough excavated to indicate the number of kivas it contained, or how many of them were in service at any one time. Also unknown is the time at which there came the change to rectangular kivas built into room blocks, as are those at Jemez, only surviving Towa Pueblo. The kivas in question, of which there are two, were functioning when Simpson (1850) was at Jemez on his way to the Navajo

country. He was admitted to both. One that he measured was 20 by 27 by 7 1/2 feet high. Their walls bore elaborate ceremonial paintings (idem:Pls. 7-11, evidently accurate copies by the artist, R. H. Kern). Murals of the same general types, but apparently not identical and therefore probably evidencing renewals, perhaps periodical, still existed in 1881 and are well described by Bourke (Bloom 1938:228); again noted in the early 1900's (Reagan 1917:Pls. 1, 3, 4, 6, 7), as well as in 1923 (Parsons 1925:Pls. 3-5, drawings by a native informant).

Tewa

Nambé. The single round, freestanding kiva of this very small Pueblo is the only one I have ever been in. The town, when I first visited it in 1922, seemed moribund. Various Indians saw me making photographs. As they made no objection to that, my wife and Singleton Moorehead and I climbed down the ladder. Entirely undisturbed, we took notes and measurements. The interior was unkempt, the plaster flaking from the adobe walls.

When we returned five years later the whole atmosphere of Nambé was changed. The kiva had been completely done over (compare a, c, Fig. 67). A native came to greet us and politely invited us to use the fine new long-poled entrance ladder to inspect the kiva. It would be interesting to know what brought about this renaissance. However, the Nambé, at least of recent years, have evidently had no objection to outsiders visiting their kiva, for J. L. Nusbaum was allowed to photograph its fireplace in 1916 (El Palacio, Vol. 3, No. 2:12).

Moorehead's plan and the photographs (Figs. 66-68) make clear most features of this structure: hatchway (Fig. 68a) 8 feet east-west, 4 feet north-south; smoke vent, east of it, about 2 feet 9 inches square; three main pine roof beams about 2 feet in diameter. West sector of roof to first beam, of timbers hewn square; long, peeled, 3- to 6-inch poles and hewn timbers made up rest of roof, its adobe surface underlain by brush and straw. The 2-foot adobe wall pierced at floor level at east by ventilator 25 inches high 16 wide; bench at west, 1 foot high, 1 wide; terraced three-sided adobe deflector 4 feet high 16 inches thick, wings protrude 2 feet 6 inches, firepit coped with adobe. Height of chamber about 9 feet. Interior with 3 foot 6 inch brown dado, thence white to roof. Pair hewn posts under central roof beam, white with black rings and facial elements. Four wall pegs (Fig. 66) at 6-7 feet above floor on which drums are hung (informant); from center of central beam dangled a shredded, twisted, much worn piece of oak sapling 1 foot long.

I have described the Nambé kiva in such detail because, so far as I know, no other round, aboveground Tewa or Keres kiva has been so treated.

Since the above was written, a most significant point I had failed to

Fig. 67. Kiva at Nambé, 1922, 1927: a, looking southeast; note (also in Fig. 66) short timbers built horizontally into adobe wall below main roof-beams to prevent crushing; b, looking north; support buttress under west beam, remains of another below central beam; c, as newly renovated, 1927; conventional ladder installed, adobe buttresses added below central and eastern main beams, exterior refinished.



a



b



c

Fig. 68. Kiva at Nambé, 1922: a, roof with hatchway; b, firepit and ladder; c, northern of two painted posts supporting central main roof-beam.



a



b



c

Fig. 69. Modern kivas: a, rectangular, Santa Clara, 1922; b, round, San Ildefonso, day of Harvest Dance, Oct., 1927; c, Santo Domingo, eastern kiva, day of Corn Dance, Aug. 4, 1915.



a



b



c

note has been called to my attention by Florence Ellis. She writes me (1957) that "aboveground" is a misnomer, she having observed--as anyone may by looking into their ground-level ventilator holes--that the floors of the kivas at Zia, Santa Ana, San Ildefonso, Isleta, Nambé are definitely lower than the surface outside. Their depth averages, she estimates, about 2 feet. Of this, at the towns just listed, she is sure. I think it is probably true of all at which such kivas exist. In any case where it occurs, it seems to indicate symbolic retention of the ancient belief, itself retained from the ancestral pit house, that a chamber in which ceremonies are performed should be subsurface.

Santa Clara possesses two rectangular, aboveground kivas one free-standing in the plaza (Fig. 69a).

San Ildefonso. This well-kept, round, adobe kiva stands clear of all structures in the south plaza. At ground level to the left of the stairway is an opening large enough for a person to crawl through. When the accompanying photograph (Fig. 69b) was taken a dance was in progress, the hole was blocked and a man stood by it, perhaps a guard. When no ceremonial was going forward, it was left open (Kidder 1924:Fig. 16b) permitting one to see something of the lower part of the interior. Below three of the six or seven large roof beams were stout vertical support posts about 6 feet long. A bench some 2 feet high and 1 foot wide encircled the chamber. Above it opened the ventilator. The three-sided deflector, with terraced back, seemed much like that of the Nambé kiva.

Keresan

The five easternmost Keresan towns each possess two round, above-ground kivas. In 1947 an internal feud resulted in the burning of one of Zia's two (Stubbs 1950:79). Laguna has none because the whole conservative element of the population left the Pueblo about 1880; but Acoma, the farthest west, is equipped with no less than seven, all rectangular and all set in the house blocks. One of Santo Domingo's two fine large round kivas is here illustrated (Fig. 69c). The fierce objection of this town to outsiders is no recent development, for in 1881 J. G. Bourke and his artist, Peter Moran, who stopped there on their way to Walpi to see the snake dance and who, each at the same time attempted to get into one of the two kivas, were seized before they were half way down the ladders and literally thrown out. In justice to the Santo Domingans, however, it should be said that this happened during the annual Corn Dance and that Bourke was told that on the following day he might enter a kiva. One wonders if this would have been so.

MORTUARY PRACTICE

I speak of this in the singular, because from the earliest times to the coming of the Franciscans at the beginning of the seventeenth century, disposal of the dead varied, as far as we could make out, in no significant way. So alike were the graves and the positions of the skeletons that one could not with certainty assign any given burial to its proper chronological horizon unless it contained "datable" mortuary pottery. But from their position in relation to graves of known phase, from the nature of the sherds in, below, and above them, or their relation to unbroken strata of determinable phase, we were able to place many with considerable assurance. The skeleton (*i. e.*, record) cards of these were marked "very probably" or merely "probably." However, about as many, especially those in the shallower deposits, had to bear increasingly less confident notations: "perhaps," "possibly," or even "unknown." In the field, estimates of age were based on the teeth for infants and children; for adolescents, such estimates were based on the epiphyseal condition of the long bones; for adults, on the degree of closing of the sutures. For all these, we had tables supplied by Dr. Hooton. For the sexing of adults and adolescents approaching maturity our principal reliance was on the pelvis, but as this is very subject to decay, we were often forced to base judgement on the general appearance of the skull and long bones.

I mention the methods used for field estimates because many Pecos skeletons were in such condition that they were obviously not worth sending in to the laboratory. These were reburied. It was in order, indeed, to find out what should be saved and what discarded as well as to learn how best to handle the material that I was anxious to have Hooton spend a season with us at Pecos. This he did in 1920 and Guthe and I profited greatly. We of course had him check our work during that summer and also our skeleton cards of other seasons with such bones as had been sent to him in Cambridge. We found that, particularly after 1920, our field observations agreed in general so well with his at the Museum that I think our notes on the discarded skeletons are reasonably valid.

No less than 1938 burials came to light at Pecos. Not counted were "loose" bones from disturbed skeletons, save skulls in sufficiently good condition to warrant collecting; nor were there recorded a large number of skulls, other bones, and some whole skeletons exposed in narrow trenches dug in 1915 just inside the Mission's nave and transept walls in order to lay concrete underpinnings.

All burials found in the northern part of the site are indicated on Figure 20, each by a dot. Our work south of the Quadrangle was not extensive, but some graves were encountered along walls and under floors of the South Pueblo, some in trenches cut to sample the long midden east of that structure, others in a midden of unknown extent outside the defense wall west of the southern part of the South Pueblo. Every burial,

both north and south, is entered with its serial number on a series of large-scale plans on file in Santa Fe; photostats of them are with the skeleton cards at the Peabody Museum in Cambridge.

Our digging was habitually carried down to bedrock or barren clay. A few rooms of the Quadrangle, however, were merely outlined and cleared to the latest floor. Thus, in by far the greater part of our operations no graves were missed; none at all, in such work as was accomplished on the North and West Terraces or in midden trenches.

That interments were made almost everywhere is clearly shown by the dots on Figure 20. The great east midden was crowded from bottom to top with the dead (Kidder 1924:Pl. 11). On the mesilla, graves were dug wherever there was sufficient earth; most, except the very earliest, in accumulations of refuse. There, as was noted in discussing conditions on the west side of the Quadrangle, there was a strong tendency to bury just outside the outer walls of groups of inhabited living rooms (Table II and Fig. 20; also Table III). This often enabled us to determine the phase of occupancy of such groups. And a burial with a classifiable pot that lay below the floor of a room proved that room to have been built possibly during, more probably later than, but almost certainly not prior to, the phase to which the pot belonged. Such a burial in the fill of a room of course provided a minimum date for its abandonment.

As soon as we began to suspect these temporal relationships, we took special care to examine all burials below or in rooms. The result was that although we found some few examples of a grave dug through a floor, we could almost always make out that its shaft had been sunk in an accumulation of refuse on the floor. And among the many Pecos interments below rooms we found no single grave-size mend in a floor to show that a burial had been put through it and the room continued in use, as was so regularly done in Mimbres and Casas Grandes villages.

Infant Burial

Underfloor burial of premature or stillborn infants was apparently not practiced at Pecos. We were on the lookout for this because in 1907 S. G. Morley and I excavated for E. L. Hewett part of Puyé, a large Pueblo IV ruin on the Pajarito Plateau. Beneath several--I cannot remember how many, but my impression is six or seven--of the many firepits, there came to light the skeletons of infants, foetal or at term. In no instance was there an offering of any sort. I cannot recall whether or not any occurred under the firepits at Tuyonyi, a ruin of the same general period on the Rito de los Frijoles, where Morley and I worked in 1908. I am sure we must have looked for them. If our field notes of those years have been preserved they will be found to contain more detailed observations on both sites than have ever been published. Hewett (1904a) records "infant burials" under firepits at Tchrega (Tshirege) and Tsankawi, sites approximately contemporaneous with Puyé.

A somewhat similar custom has persisted to the present in certain Pueblos. Goldfrank (1927:77) states that at Cochiti a premature baby is buried under the floor of the house, just inside the threshold; and White (1935:85) says that at Santo Domingo stillborn infants are buried under the floor of the mother's house. Parsons (1939:71), quoting various authorities, says that at Cochiti and Zufi a baby dying before baptism is buried in the house; the Isleta stillborn in a cave; those of Sia or Taos, as well as the unbaptized, are buried apart, north of the town or in the mountains. At the Jemez ruin of Unshagi, according to Reiter (1938:64) were many sub-floor interments, particularly of infants.

Thinking that house or firepit burials might have been made at Pecos, I dug below every firepit encountered, but none was found; nor was there evidence that any infant had been placed under the floor of an occupied room. It appears, therefore, that the Pecos did not share with the ancient Pajaritans and the above-named Pueblos the custom of special, perhaps propitiatory, interment of babies deprived of a chance to live or lacking the assured spiritual safety of baptism. However, at Pecos there came to light in pottery vessels the bones of three very young infants, late miscarriages or stillborn (Skels. 275, North Terrace, in blind corrugated jar, prob. Gl. I; 799, East Midden, in plain black jar, prob. Gl. III or IV). A third, even younger, was found near Kiva 9 in a small black jar (Skel. 1407, foetus circa 7 mos., prob. Gl. IV). These were the only instances of urn burial. Here it may be mentioned that we found no evidence of cremation nor, so far as I know, has this custom been reported anywhere in the Upper Rio Grande.

Since the foregoing was written, Dr. Titiev has kindly given me the following pertinent note regarding Oraibi:

"Children who died while they were still too young to have been initiated into katchina are not interred but are placed in crevices in the side of the mesa. Babies of one family must be placed in the same spot so that the souls may be the more easily kept together.

"Souls of baby children are said to rise on the fourth day and to return to the mother's house where they linger just under the roof and are reborn in the mother's next child. A change of sex is considered a favorable sign as it is said that if the new baby is of the same sex it will probably die. If the mother fails to have any more children, then the soul is said to be reborn in the next baby born to a woman of the same household or clan." (Letter of Jan. 24, 1957.)

This belief must have been comforting to mothers of communities in which it was held, for infant mortality was very great at all Pueblos from which we have reliable statistics. It doubtless explains the various above-described special customs governing infant burials and, of course, negates my idea that propitiation or, in Catholic times, spiritual security might have been involved. Seemingly, so widespread and consoling a belief should have obtained at Pecos. If so, it must have been given effect in some different way because we found no evidence that infant dead were interred away from the town or segregated there.

Phase of Burials

Of our 1938 Pecos burials, 56 were from a small excavation in the nave of the church. These, having been made under Catholic auspices are described separately, as are 59 burials at length, a puzzling lot, almost all of which were certainly very late. The remaining 1823 ranged from Black-on-white through Glaze V. We were, as has been said, reasonably sure of the age of numerous graves that contained no pottery. Nevertheless, I have felt it safer to use only the 573 burials that contained decorated mortuary vessels in preparing the following tabulation.

Table V

Number of burials of each phase
and of those containing Biscuit Ware only

Black-on-white	62
Glaze I Red	52
Glaze I Yellow	72
Glaze II	84
Glaze III	126
Glaze IV	75
Glaze V	27
Biscuit A	33
Biscuit B	42
Total	573

Comment: Biscuit A and B, as shown by Anna Shepard, were made in the country north of Santa Fe, reaching Pecos in trade (Kidder and Shepard 1936:487 f.f.; the Biscuit ware area is defined in Mera 1934). The earlier form, A, was in use at Pecos during Glaze I and II; B, from late Glaze II, through III and well into IV. For this reason, graves containing only Biscuit cannot safely be assigned to a phase. Where, as occasionally occurred, both a Glaze and a Biscuit vessel were in a grave, it was listed for Table V on the basis of the former (for history of the Glazes, see Kidder and Shepard 1936; Shepard 1942; Mera 1933). Some graves held only culinary ware, which at Pecos changed too slowly to serve reliably as an indicator of phase.

The figures of Table V represent the habits of the Pecos in the matter of ceramic offerings, rather than the amount of pottery of this or that phase in use at any given time. That could more accurately be calculated from counts of potsherds from many more stratigraphic tests in all parts of the site, such as those already published (Kidder, M. A. and A. V. Kidder 1917; Kidder and Amsden 1931). We may also not have hit upon midden areas where certain phases were adequately represented. For example, there were no Black-on-white graves or rubbish in the east midden east of the South Pueblo and almost none earlier than late

Glaze II. On the other hand, I believe many Black-on-white graves probably exist below the Quadrangle and in the plaza, where we did relatively little digging. Glaze IV, at least at Pecos, seems to have been a relatively short, rather than an extra parsimonious phase. Was the great fall off of mortuary pottery in Glaze V due to a native cultural change, or to the coming of the Spanish? From the amount of its refuse the phase was evidently a long one. This problem was raised in discussing the abandonment of kivas during Glaze IV; it will again come up when the burials at length are described.

Age at Death

The table on page 284 presents two sets of figures: those in the left-hand column show the age at death of the 1823 Pecos Indians whose skeletons were excavated by Phillips Academy, but omitting the above-mentioned 59 at length (Table VIII) and 56 interred in the Mission; the remaining columns contain the same data for 573 of the 1823 that were assignable to phase or were accompanied by Biscuit ware (see comment on Table V).

Almost all these deaths occurred in prehistoric times. The table shows clearly enough that if one survived infancy one's chance of reaching middle age (30-50) was good, but much to exceed 50 was rare.

It should be noted that the ages here recorded differ from those of Hooton's Figure II-1 (1930:19). That figure was compiled from 594 skeletons submitted by Hooton to T. Wingate Todd in 1927. Among them were only a few of the best preserved children's (0-4 years) skeletons. Others of that age group Todd considered, "scattered remnants that, as usual, must be discarded." To a considerable number of the 230 skeleton cards, there spoken of by Hooton as without record of age or sex and therefore disregarded by him, there were later made not a few additions, some as to age by one of his assistants from the "scattered remnants" in his laboratory, others from the "progress" field plans, on which each day was entered the serial number and often the age of every skeleton encountered. For these reasons the figures for infant mortality in my Table VI are far larger, and certainly much more realistic, than those of the Hooton-Todd Figure II-1.

While we are on the subject of Hooton's splendid monograph, it may here be interpolated that he was not able to include in his studies of the Pecos bones 327 skeletons exhumed in 1925 and 1929, or any at all from Forked Lightning. This is the more regrettable because the latter are the earliest skeletons so far known from the Pecos Valley, and Hooton states, "the deviations from the means of the entire series are largest and most frequent in the Black-on-white and Glaze I subgroup. . . . the crania in the last periods become more and more typical of the [Pecos] group as a whole and more homogeneous" (*idem*:74). One wonders if this could be the result of a mingling of people from Plateau and Plains. The Forked Lightning material, although not large, might throw light on that problem.

Table VI

Age at Death

All Skels.	Yrs.	B.-W.	G.IR	G.IY	G.II	G.III	G.IV	G.V	Bis. A	Bis. B	Total
322	0-1	12	4	8	7	8	6	2	8	4	59
117	1-3	8	3	4	6	6	2	1	4	2	36
120	3-9	5	2	5	4	7	3	1	1	2	30
145	10-20	6	5	7	6	12	7	7	3	4	57
107	20-30	8	8	12	20	28	18	4	3	7	108
772	30-50	15	15	22	31	45	28	11	10	15	192
189	50 up	7	10	14	10	17	9	1	4	7	79
<u>51</u> 1823	<u>?</u> Total	<u>1</u> 62	<u>5</u> 52	<u>0</u> 72	<u>0</u> 84	<u>3</u> 126	<u>2</u> 75	<u>0</u> 27	<u>0</u> 33	<u>1</u> 42	<u>12</u> 573

Comment: Age determinations by E. A. Hooton of skeletons sent to Peabody Museum and by him at Pecos of 248 found during the 1920 season. Ages of skeletons reburied in other years, because too badly preserved for study, were estimated by the field staff. Of the 322 infants of less than 1 year, 19 were listed as foetal, 48 as at birth. It could not be determined which of the latter were stillborn and which died so early as to have made no post-natal skeletal growth. Age of skeletons preceding and following interrogation point was not recorded, in most cases, because of bad condition.

Burial Position

Practically all pre-Spanish interments were flexed, the exceptions being a few at length, mostly small infants, also four adults, all of which we believed to be pre-Spanish (for the post-Spanish burials at length, see Table VIII). The present table (Table VII) was prepared from the cards of the 511 "datable" skeletons of whose burial positions we could be sure. This necessitated the elimination of a number of infantile and fragmentary adult skeletons, as well as the very few in unusual positions described below. The phase and Biscuit assignments are as on Tables V and VI.

Table VII

Burial Position

	B. -W.	G. IR	G. IY	G. II	G. III	G. IV	G. V	B. A	B. B.	Tot.
Left Side	9	10	17	15	17	11	4	6	11	100
	18.3	21.7	27.8	19.7	14.4	15.7	14.0	25.0	27.5	19.6
Right Side	10	13	18	14	21	6	2	2	11	97
	20.4	28.2	29.5	18.4	17.7	8.7	7.4	8.3	27.5	18.9
On Face	12	16	22	47	73	52	20	14	16	272
	24.4	34.7	36.0	61.8	61.8	74.4	74.0	58.3	40.0	53.2
On Back	18	7	4	0	7	1	1	2	2	42
	36.7	15.2	6.5	00.0	5.9	0.1	3.7	8.3	5.0	8.2
Totals	49	46	61	76	118	70	27	24	40	511

Comment: The upper of the paired figures under each heading gives the number of skeletons, the lower their percentage of all skeletons in the same vertical column.

Most common was face-down, tightly flexed burial, legs closely bent against the chest, hands under chin (Kidder 1924: Pl. 10c). Of the 272 bodies so placed, only 26 were noted as loosely flexed, the knees of the folded legs protruding, but seldom strongly, to one side or the other. Not only by actual count but by percentage of occurrences in graves of each phase and those with Biscuit, the face-down position was strongly preponderant except in the Black-on-white phase, in which tightly flexed burials on the back led in percentage, and numerically (18) came very close to equaling right- and left-side burials combined (19). From Black-on-white on, they fell away rapidly, while face-down occurrences became more and more frequent.

I should perhaps not have separated burials on the side into rights and lefts, for both numerically and in percentage the two ran so closely

Fig. 70. Burials: a, b, unique interment (Skel. 394, adult male, probably Glaze II), feet held down by heavy rock, moved aside for photograph, fortunately taken before clearing of skeleton began because position of ends of femora was unusual; ends of toes little over a foot from back of head; c, heap of bones reburied after disturbance of graves in East Terrace during digging pit for Kiva 3, probably in Glaze III.



a



b



c

together throughout as to make it seem certain that, unlike the on-face and on-back cases, there had evidently been no preference for one or the other. The degree of flexion of these skeletons was seldom noted in writing, but a run-through of the drawings on the 1800-odd cards and of the scores of photographs shows that many were tightly flexed, but that in an apparent, but not large, majority the flexion was somewhat loose, the more or less closely folded legs protruding at various angles from the line of the body (idem:Pl. 10b).

There were, of course, many minor variations in the arrangement of arms and legs, but among the entire prehistoric lot only six skeletons were found in radically unconventional positions. Of these, four had been buried sitting upright, closely flexed (Skels. 4, ad. m., phase ?; 758, eld. f., Gl. III; 1345, eld. m., B-W; 1644, ad. m., B-W.). The other two were much more strange. One (Skel. 127, adol. m., prob. Gl. IV) was doubled face down at the waist over the outstretched legs, head between shin bones (idem:Pl. 11b). That this individual's body had been forced into so unusual a position seemed proved by the fact that large rocks had weighted down the head and shoulders. An even more extraordinary burial (Skel. 394, ad. m., prob. Gl. II) was also face down but with the legs bent backward, the feet brought forward with toes near back of head (Fig. 70a, b). Much force must have been used to get a body into this attitude. A large rock held down the feet.

At Pecos, there was seemingly no more interest in the orientation of burials than at Forked Lightning (cf. Fig. 2). Interments in sloping middens, as on the east side and elsewhere, were usually made parallel to the slope, but with no preference for one direction or the other. Many graves, particularly of infants, were sited without regard to the incline. Those in open middens on the relatively flat-surfaced mesilla, were headed toward all points of the compass. Where a wall was involved, the grave was generally run along it, again with no directional preference.

Graves

Except for burials at length, graves were merely oval holes, usually fairly flat-bottomed, sides vertical or sloping slightly inward, just large enough to accommodate the normally, perhaps almost always, bundled corpse. Most graves were seemingly very shallow. A large percentage were dug in the upper layers of growing middens, which at the time of any given burial had seldom become much packed down. Furthermore, they were refilled with the excavated material. Thus it was usually impossible to make out their original depth or horizontal extent. But streaks of white ash in the refuse sometimes served, when cut by a grave, to supply reliable data as to its size and occasionally its depth (see shafts in Kiva 6 fill, Fig. 40). Numbers of graves could not well have been as much as 2 feet below the surface (Skels. 1694-1697, Fig. 35). Burials at length were often among the grass-roots (Fig. 71d). On

the North Terrace the deposit was shallow and contained many ash and sand strata. Some of these ran unbroken only 14 to 20 inches over flexed skeletons. The deepest shaft of which I have record (Skel. 1787, adol. m., Gl. V) had been sunk nearly 5 feet from the plaza level (Fig. 45); a child (Skel. 764, Gl. III) was buried only a few inches less deeply (Fig. 40).

Some graves, probably all, were dug with the planting stick, a stout wooden implement whose flattened end was pointed (Kidder 1932: Fig. 239). Marks of this tool could be seen in the lower part of several early shafts which had been carried down into hard red clay.

Nothing more clearly illustrates the classlessness of the Pecos than the uniform simplicity of their graves. Not one of the nearly two thousand we opened was outstanding in construction or, as will be seen, in wealth of offerings. The most elaborate--and no other came even near to matching it--was that of Skeleton 990 (ad. m., about 30, prob. Gl. I). Its flat, oval bottom was 42 inches long, 23 in greatest width. The loosely flexed skeleton lay on its side, the back curved to fit closely the grave's wall, head bent forward, occiput against the end. Close over the body, sticks about 1 inch in diameter were set across, some 6 inches apart, their ends apparently supported by a ledge left around the grave shaft. On these were laid small sandstone slabs, making a flattish semi-arched covering, 12-14 inches above the floor. The sticks, of course, had rotted, but the marks of their ends could be made out in the unusually clayey soil, which held the slabs so well that only one or two had fallen. The upper part of the shaft could not be traced, but the dimensions of the floor seem to have been about average for graves of adults. Under the body were impressions of an unusual type of mat (described below, and see Kidder 1932: Fig. 248). In the forehead, its tip having just pierced the bone, was embedded a flint arrowpoint, one of obsidian lay among the ribs. Only one other burial had been, so to speak, roofed. This one, of a Glaze III adult male, was protected by rods laid crosswise of the grave. Over a Black-on-white elderly adult female were traces of brush, apparently cedar boughs. They had kept from the body a heavy piling of large rocks.

Another interesting grave was that of an adult male, probably Glaze IV. It had been dug in refuse on the North Terrace, so firmly packed that the lower, slightly incurving walls of the pit could clearly be made out and although there had been no supporting sticks, the fill had not collapsed and so retained a perfect cast of the burial bundle that had contained the tightly flexed, face-down skeleton. The wrapping had apparently been of hide, for it took folds and creases but left no marks of matting or textile.

Occasionally at Pecos, an open air-filled space developed, as in this case, in the fill of a grave or under an unbroken inverted pottery bowl. In such a space, bone, as well as all hide and vegetable substances, became completely rotted while the pile of feathers and human or animal hair was sometimes astonishingly well preserved (*idem*: 288). In

this grave the upper parts of the bones had mostly shriveled to black wisps, but bits of hair lay on the skull. Partly protected from the consuming decay by the bones of the tightly folded right arm were remains of two ears of corn laid tip to tip against the breast. Under the chest of a skeleton, probably Glaze III, listed only as "infant," lay side by side two corn cobs. As they were badly rotted, it may be that their kernels had decayed.

Good specimens of hair were recovered from open spaces over four other skeletons, all adults. A middle-aged female, Glaze II, had braided hair, apparently a single pigtail; an elderly male, also Glaze II, had gray head hair, darker curly pubic hair; a male of 40-50, Glaze III, had seemingly well combed, but not braided, hair; long tresses, tangled and uncombed, lay from the base of the skull along the right humerus of an adult female, Glaze IV, buried face down.

There occurred three cases of 6- or 7-month foetal skeletons in the pelvic region of young adult females. We noted one certain and one probable double burial. In the first, an infant of some 2 years and a child of 6 or 7 lay side by side, the remains of a single rush mat running unbroken beneath them. A Glaze I Yellow bowl was beside the younger. Probably interred together were a young adult female and a very small, perhaps stillborn, baby. The two skeletons were so close, but without the least displacement of bones, that the bodies could hardly have been buried separately. With them were two Glaze I Red bowls.

Disturbance. The above brings up the matter of the disturbance of skeletons by later burials. I have not worked out the number of such cases and I doubt if every one was recorded, certainly not the single "loose" bones that turned up in our excavations. And where burials had been made close together it was often not possible to tell whether missing bones had been removed in the digging of a second grave or by prairie dogs, whose holes could often be seen to have torn out parts of skeletons. Disturbance was not common in the great eastern midden, in which there was not only much room laterally, but where the relatively rapid growth of the heap soon put burials safely below the shallow interments of later comers. More took place in the relatively thin deposits on the mesilla, particularly in the plaza and on the West Terrace, where so many dead were crowded together (see Fig. 20). Even there, however, there was surprisingly little disturbance.

A bundled corpse was large enough to have caused some mounding of the fill that might temporarily have indicated the presence of a grave. But where, as on the west side of the Quadrangle, burials were clustered along the walls of occupied rooms, little heaps of this sort could not long have lasted. We found no evidence of any form of marker. Stephen (1936: 825) states that the Hopi (of Walpi?) thrust a planting stick and a long prayer stick into the grave, but he fails to say whether or not these were allowed to remain. I infer, however, that they were, as he mentions that at the winter solstice ceremony following the burial, a prayer stick is "also" thrust in the grave. The Hopi, I think of all Pueblos, bury their

dead at some distance from the dwellings. At Pecos, where they were interred so close to the houses, the leaving of protruding sticks would seem to have been unlikely.

I believe, in spite of the occurrence of a certain amount of disturbance, that the Pecos would not intentionally have violated a grave. If so, some pains must have been taken to avoid digging into even only relatively recent ones. Perhaps confirming this is the fact that in but one exceptional case did we find any part of a disturbed skeleton held together by ligaments. Yet when a burial was encountered, very seldom was any special attention paid to the bones, which were merely thrown in with the fill or cast into some nearby excavation. I think, however, that they were never left on the surface, because none was found to have been gnawed by rodents, as were many animal bones, nor did any, before being covered, become pure white, a result only produced by sun-bleaching. The exception just mentioned was the heap of skeletal remains (Fig. 70c) from burials that were removed in digging the pit for Kiva 3. The bones, some still in natural order had been carried well downhill and reinterred.

We found no instance of true secondary burial (Hewett illustrates one from Otowi, the bones stacked in a Biscuit B bowl). Of our only two cases of care being given to bones of disturbed skeletons, one occurred among the crowded burials below Room 29, facing the plaza. An adolescent female's grave had scattered the remains of two infants; that of an adult male had in turn cut away the girl's skeleton just below the ribs, leaving pelvis, lower vertebrae, and flexed legs as originally buried. Where her head had lain was indicated by some upper teeth under the intruder's pelvis. The other bones, including mandible and skull, along with the pieces of a Glaze I Yellow bowl, were neatly piled together before the grave was filled. The second was much the same, but with sexes reversed. The male's pelvis and legs were undisturbed. Sherds of his two Glaze III bowls were scattered at random over the female's skeleton, but in front of her head one large fragment, concave side up, covered the male mandible and set in it, as in a dish, was the skull.

Before offerings are considered, there should be mentioned the 30 or so graves in which heavy stones had been laid over the body, usually along its whole length. These burials were of most phases, both sexes, and of individuals from infancy to old age. They also occurred with two at length. In the two instances of distorted bodies, described in connection with burial position, they clearly served to hold the cadaver in an unnatural posture. The purpose of the others is a mystery. It could hardly have had any practical purpose, for the earth from the grave would, when thrown back in, have sufficed to keep the body in place. Only once is it noted that stones, not slabs, lined a grave's sides. Neither was ever on the bottom.

Accoutrements and Offerings

Perishable Material. The skeleton cards list 19 burials as foetal. Forty-eight were recorded as "at birth." All these 67 may not have gone into their graves just as they came into the world, but with no one of them was any discernible trace of clothing or wrappings. The same was true of all but one of the 255 others under one year, and of the 117 infants from one to about three. But even the youngest babies buried in "dry" caves in other parts of the Southwest have always been found carefully wrapped. Furthermore, infants of our one-to-three group were, for Pecos, fairly well supplied with imperishable offerings. It seems probable, therefore, that the small size and slight weight of these infants and very young children was responsible for the absence from their graves of packed down cerements or prints thereof.

We recovered, indeed, little enough evidence as to perishable materials accompanying adolescents and adults. Most common with these, 14 examples, were rotted remains of rush (tule) matting or--always below where the body had lain--the impressions of its usually over-three-under-three twill. That these were in graves of every phase except Glaze II, emphasizes the unchangingness of Pecos mortuary practice. A more unusual mat consisted of thick-stemmed grasses or thin reeds laid side by side to form strands about an inch wide, which were then woven together, apparently over-two-under-two (Kidder 1932:300, Fig. 248).

Mats were sometimes used to line the grave, as well as to wrap the dead; perhaps more often the bundled body was placed in an unlined pit. Occasionally a bundle had been underlain by shredded cedar bark and there were two cases of "coarse bark" mats, presumably cedar. Next in number to mats came "hide." Most of the nine instances appeared to be bare, probably prepared leather, but one bore the short hair of a deer, two others, thick, curly buffalo wool. There were three certain cases of feather-cloth blankets of the usual sort (Hough 1914:71, Figs. 148, 149); between one of these and the body there had been a textile, undoubtedly cotton, which seemed to have been painted red. There were six other instances of cloth, all but one of plain weave and all prehistoric. The exception was a "fine twined textile"; it was with a baby of about eight months, the single infant burial, referred to above, in which there remained any perishable material.

Burial "bundles" have frequently been mentioned. Even had we had no direct evidence, such preparation of the Pecos dead could safely have been inferred because of the many wrapped bodies that have been reported from the Southwest (excellent descriptions and photographs of burial bundles in the Aztec ruin are in Morris 1934). Not only did we find parts or prints of the mats and hides, but in four cases it was possible to make out the bindings that had held them. Two were strips of deciduous bark; two were strips of hide, one tied in a square knot.

Of coiled basketry, although it was commonly and well made at Pecos (Kidder 1932:296, Fig. 245), we found not a trace in any grave. I was

constantly on the lookout for it, especially where burials had been sunk into clay, which should have retained the imprint of so rigid and strongly marked a weave. There did, however, come to light presumptive evidence of the so-called ring-basket. This form made by the Anasazi from at least Basket Maker III onward, is still turned out at San Felipe (Kidder, field notes), the Hopi towns (Colton 1938:16, Fig. 14) and perhaps other present-day Pueblos. It consists of a small twilled mat of yucca-strips bent into bowl-like shape by being forced into and attached to a hoop of willow or other pliable twig (Morris and Burgh 1941:passim). We found two examples; neither retained its hoop, but the rotted fabric of each showed the characteristic yucca-strips; the weave-interval, as in most Pueblo III ring-baskets, was over-three-under-three, rather than the over-two-under-two interval of earlier Anasazi examples. One accompanied a young Black-on-white male, the other a Glaze III baby.

Finally, among the all-too-rare perishables, were a loosely woven cotton textile with shaggy yucca fibre pile (Kidder 1932:302); the fragment of a yucca sandal at the foot of a late skeleton at length; a bit of leather with a sinew-sewn seam at the foot of a Glaze III adolescent, apparently part of a mocassin; and with an adult Glaze III female the remains of a prairie-dog (?) skin sack containing ground galena, beside it two balls of red ocher, perhaps cosmetics.

Imperishable offerings. In this category pottery held undisputed first place. Tables V and VI make clear the distribution by phase and by age of recipient of the 573 or more decorated vessels, of whose place in the ceramic history of Pecos we could be certain. Youngest to be accompanied by a pot was a foetal skeleton with a little Black-on-white bowl over the head; another foetus had been covered by a Glaze I Yellow bowl. The black jars that contained the three foetal or stillborn infants mentioned above can hardly be thought gifts. The large sherds of culinary vessels, often laid over infants "at birth" or a little older were, it would seem, merely to protect the body. The 20 Black-on-white bowls with babies, as well as vessels of later phases (see Table VI), were undoubtedly all offerings. In 42 graves were culinary jars, usually small, almost but not entirely all with infants and small children. As has been said, these cannot accurately be "dated" unless accompanied, as sometimes occurred, by decorated pieces. Of 13 little black "duck-pots," 12 were mortuary, ranging from Black-on-white to Glaze IV (Kidder and Shepard 1936:338). Of either decorated or black vessels there was not often more than one in a grave, very seldom even two and, I think, only once were there three. The Pecos were never lavish providers for the dead. Often the bowls were not of the finest, a good many were incomplete, the broken edges worn by prior use. Position varied, but the pot was usually near or over the head, most often inverted (Kidder 1924:Pl. 10c). With an adult female flexed on the side was a Glaze I Red bowl tucked on edge between the back and the wall of the grave. The decayed wrappings were a soft black streak between vertebrae and pot. As a rule the vessel went into the grave whole, but occasionally it was smashed and the pieces--

not invariably all--were scattered over the body (idem:Pl. 10b). If this was a form of "killing," it was not the Mimbresños' neat puncturing; the small hole in a Pecos unbroken bowl (idem:Pl. 10c) was made by a workman's pick.

A puzzling find was a large Glaze I Red bowl, full to the brim with the pure white ash characteristic of kiva firepits. It lay beneath the lower part of the body and the flexed legs of a middle-aged male.

Aside from pottery, arrowpoints were by far the most abundant imperishable objects with burials, nearly a hundred being recorded on the skeleton cards. How many of these had been carried in the flesh of bodies there was no sure way of telling, for points were not uncommon in the Pecos middens and an occasional one may well have been contained in the fill of a grave. Also, they were often included in the "medicine outfits" buried with certain adults of both sexes (Kidder 1932:106-8). Smaller groups or scatterings of the sorts of objects contained in the more elaborate outfits were noted on several skeleton cards; in some were arrowpoints. Single specimens, too, might well have been worn in life as charms or fetishes (Parsons 1939:106). We accordingly examined with care the position of every example that seemed surely to have accompanied an adult skeleton--only six were noted as doubtfully accompanying a child or infant. As to three adult cases, one from the Rowe ruin, there could be no doubt, as the points were firmly embedded in bone. Two, in vertebrae, have been illustrated (Kidder 1932:Fig. 5), the third had been driven into the forehead of Skeleton 990, whose grave has already been described. Nine others appeared certainly to have been the result of arrow penetrations, probably lethal. Each of four (Skels. 263, 271, 633, all prob. Gl. I; 1088, Gl. III) lay within the rib-cage; two (Skels. 1393, Gl. I; 1842, phase ?) were within the pelvic girdle; one (Skel. 1415, prob. Gl. IV) lay close against the thoracic vertebrae, one (Skel. 161, "early") lay between sternum and vertebrae; and one (Skel. 341, at length, prob. post-Spanish) was more than half way between two of the lower lumbar vertebrae. In the left hand of this individual was a four-bladed knife of alibates dolomite (idem:Fig. 14d). All the foregoing were among the bones of adult males.

Several points and scrapers of the latter stone were with other chipped implements, as well as bone and antler objects and two pipes, in the grave of Skeleton 327 (ad. m., prob. Gl. IV). Evidently this unusually richly equipped individual had been a flint worker (idem:42, Figs. 22, 150d, 151g).

Offerings with adults were generally utilitarian: snub-nosed scrapers, plain and bevelled (two- and four-bladed) knives, two arrow-shaft straighteners but no arrow-shaft smoothers, five axes (idem:53), and pot-polishing pebbles. In only one case did a metate accompany its user, a middle-aged female. It was on edge against her body, a Black-on-white bowl at her feet. Eight pipes were in graves, mostly Glazes III and IV and of aberrant forms (idem:182). The only object of European origin with a burial other than in the Mission was a ragged scrap of iron under the head

of a flexed male skeleton, probably Glaze V. Implements of bone, generally awls or flakers, and a few of antler were listed as in some adult graves, but as these were very common in all refuse their status as offerings was often questionable.

Ornaments of any sort seldom occurred with adults: tubular bone beads, shell beads, and very little turquoise, which seems odd in view of Castañeda's statement that it was abundant at Pecos. Shell and turquoise was almost entirely reserved for infants and young children. Even so, I find record of such offerings with only a score or so of the 439 in the under-three age-group (*idem*: 101-103, 186-93). Shell was much the most favored gift, being with 13, all under two years, and representing surely or probably Black-on-white, Glazes I Red and Yellow, III, IV, and V. Of these, shell alone was with 11, much of it too badly rotted to be certain of number or nature of objects, but there were pendants, disc beads, strings of *Olivellas*, and *Oliva* tinklers; most were at neck or waist, once at wrist. A long string of disc beads with a turquoise bead seemed to have been laid along the upper arm of another; a second had 50-75 tiny bivalve shells, evidently strung, an *Olivella* and two turquoise pendants, all at waist; a pair of turquoise mosaic ornaments (*idem*: Fig. 78) was with a Glaze III or IV baby. Cylindrical bone beads were with two infants, in both cases loose in grave; fifteen and three pierced wolf molars, with one; five and a crinoid stem, with another. A beaver-tooth pendant was at the head of one infant and over the head of one had been laid a smoothed stone cooking slab.

I have not attempted to compile statistics as to possible correlations of age and sex with burial position and presence or absence of mortuary offerings. Data on these matters can be had, if desired, from the skeleton cards on file at the Peabody Museum in Cambridge. My own work with the cards, however, and that of Vaillant, done independently on those of all burials found before the end of the 1924 season, left us with the strong, but untested, impression that no significant correlations would be found. We reached that opinion because so little care seems ever to have been paid to the disposal of the dead, burials having been so similar from beginning to end of pre-Spanish times; also because offerings were so far from lavish and apparently so haphazard.

Attitude Toward the Dead

This leads to consideration of the attitude of the Anasazi in general toward death and the dead, a matter on which archaeology throws relatively little light beyond what is indicated by the amount of care taken in the preparation of graves and number and quality of mortuary offerings. Ethnological findings are naturally more rewarding. Parsons, in her masterly work on Pueblo religion, has gathered and synthesized all available date, adding many observations of her own (1939: 68-75. See also very full index references to other parts of the text under "Dead" and "Death").

Notable, although she does not, I think, mention it specifically, is the surprising lack of Christian influence on mortuary beliefs and rites, not only in such isolated communities as Zuñi and the Hopi towns, but on the Pueblos of the Rio Grande, which have for so many years been subject to ecclesiastical control and teaching. In them, outward forms are, indeed, regularly followed, local Saints revered, but real credence seems to be almost wholly non-Christian.

According to Parsons, there is implicit belief in life after death, but in neither Heaven nor Hell. Future punishment is exceptional in Pueblo ideology except among the Hopi, who believe the deceased, if deemed unworthy of the guardian of the trail to the hereafter, to be thrice tested in fiery pits. Should he emerge still unpurified, he is utterly consumed in the fourth (*idem*: 216). Elsewhere, irrespective, it would seem, of an individual's faults or virtues, the future life is thought closely to parallel mundane existence, including association with the same esoteric group to which he or she had belonged on earth.

In spite of this, the Pueblo dreads death. Long life is considered the greatest of blessings. Demise, known to be inevitable, is viewed fatalistically. The living, although not as permeated with fear of the dead as are the Navajo, regard the released spirit by no means without apprehension, especially during the four days that it hangs about and may, if the correct ritual is not followed, drag one down to join it in death or cause calamities of various sorts.

A corpse is buried as soon as it can be prepared for the grave, the same day if possible, or early the following morning. Neglect of any kind causes "death scare" a virulent, sometimes fatal, sickness. An angered spirit may "come back." But once the four days are over and, as is sometimes done, the path to the grave has been barred against return by cross lines of prayermeal, the deceased is kept as much as may be out of mind. Only at Taos, does one speak of the dead.

Dr. Titiev has very kindly given me permission to quote pertinent material from his data on the Hopi Pueblo of Oraibi, where an informant, X, told him that a stick called a ladder was partially inserted in a grave, with the idea that the soul could crawl up it on its way to the home of the dead.

From his diary of 1934: "While I was working with the chief and W, little X came in to report that Y had taken a turn for the worse. Thereupon both adults left immediately to carry the old man out of Tawaovi (the chief kiva of those days), as it was bad to have a man die in a kiva. 'It might bring cold,' said W. Accordingly they brought Y to the clan house of W's mother and bedded him down with considerable trepidation because of his vermin.

"Afterward, W gave me some of the details of the burial. A grave was dug about six feet deep. Then a groove was tunneled out at right angles, and it was into this groove that the corpse was placed, facing east. The opening was stuffed with blankets and weighted with stones. Then the whole thing was filled in."

For further notes on Hopi burial customs, gathered at Oraibi from W and Z, I am also indebted to Dr. Titiev.

"At a person's death his hik'si (breath or soul) is said to make its exit through the mouth. Some Hopis try to keep a person alive by rubbing the chest to keep the hik'si within the body for a longer period. In regard to this custom W said, 'It makes the person suffer, but we hate to have our people go.'

"When a death occurs, only the immediate household and those who are helping the sick one may lament. There is no formal wailing, no singing and no special ceremony. Outsiders and distant relatives do not come to view the corpse. 'It doesn't look very nice.'

"When possible, burial occurs on the day of the death as soon as the corpse has been washed and dressed in its best clothes by men if a male or by women if female. Where the death occurs late in the evening or when the one chosen for the burial office must be summoned from a distance, interment takes place the next morning at daybreak.

"The burier carries the wrapped body on his back down the mesa to the cemetery. He goes alone and there is no procession or cortege of any sort. The body is placed in a deep hole facing the east, the knees are bent and the corpse is disposed in a sitting position, braced against the wall.

"Some belongings may be put into the grave and these are sometimes burned so that the spirit 'will take them home.' Water, piki, and meat are put into the grave. A nakwakwosi is put in the left hand, a prayer stick is placed on the breast, and two nakwakwosi feathers are tied in the hair at the center of the head. No mutilation, such as the cutting of a lock of hair, is permitted as this is thought to cause the death of another person in the family.

"The spirit is said to arise on the fourth day, to follow a cornmeal path as far as it can to the east (path of life), and then to turn and proceed westward to the house of the dead, Maski. It is supplied with a 'lunch' in the form of water and piki or meat which is placed on the grave on the third day in anticipation of its rise on the following day. At the same time prayer sticks are deposited and the appropriate cornmeal paths are made. Any objects meant to be buried with the corpse which were forgotten, may be placed on the grave. An inquiry in respect to breaking (killing) objects intended for the dead brought the reply that it would be foolish to break things as it would make the contents leak out.

"As a general rule, young children of either sex are buried by the father, a wife by her husband, a young husband or bachelor by his father, an old man by a son, and an old woman either by a son or by the husband of one of her daughters. The rule is not inflexible, and a near male relative may be chosen almost under any circumstances.

"All mourning after the burial is individual and informal, except at the Soyal (and, perhaps, some other ceremony), when prayer sticks are made for the dead. Too much display of grief is considered unseemly and it is bad form to speak too much about a dead one. In view of the

high infant mortality, the Hopi beliefs in regard to dead children are extremely comforting and sensible."

As intimated above, archaeology can yield little information on the attitude of the Anasazi toward the dead. This, of course, is not the place, nor do I command the data for a detailed discussion of Southwestern burial customs or mortuary offerings, but some chronological aspects of the subject may be pointed out, as well as certain differences between prehistoric groups.

The earliest known Anasazi, those of the San Juan Basket Maker II stage, took pains to see that their dead, from infants to the aged, were well wrapped for burial and lavishly supplied with grave goods, many of which--coiled baskets, twined woven bags, long rabbit nets and very elaborate sandals--represented great expenditures of time and labor. Less is known of later Basket Maker or of Pueblo I to III perishable offerings, because burials during those stages were much less often made in dry caves. Where such interments have been found, however, they were at first generously equipped, but as time went on fewer and less valuable gifts of this nature were made. Nevertheless, during the first Pueblo stages the average grave throughout the whole Anasazi range contained at least a few pieces of pottery, but seldom much in the way of stone or shell jewelry. However, we almost completely lack knowledge of the mortuary customs of the highest of all Anasazi cultures, that of the extraordinary people who built the great pueblos of Chaco Canyon. A few intra-mural burials have been found in them, some accompanied by very fine objects, but what became of the other hundreds of Chaco dead remains a mystery.

The early Mesa Verde and Kayenta graves were reasonably well supplied with pottery, but at the climax of both these San Juan subcultures, burials are again rare and often contain little or nothing. Whether or not this was a result of whatever brought about the abandonment of the San Juan in the latter part of the thirteenth century is not known.

So far, this very sketchy review has been confined to the cultures of the San Juan. Well before their final breakup, however, people farther south, for example on the Upper Gila drainage and the Mimbres (the status of some of these as Anasazi or Anasazi-tinged Mogollon is still not entirely clear) were doing, on the whole, better by their dead, both in amount and quality of mortuary pottery and in jewelry, especially of shell.

While all this was going on, there flowered the extraordinary Hohokam culture of the Middle Gila and Salt River valleys. Whether brought from Mexico by immigrants, as some believe, or developed in situ and readily absorbent of Mexican elements, Hohokam in almost every way differed strongly from Anasazi. The dead were cremated, very beautiful objects were burned with them, or sometimes deposited unburned with the calcined bones. The devouring crematory fires and the lack of protection from moisture of perishable Hohokam remains have left us ignorant of much we would greatly like to know. But beautiful and most in-

tricate cotton weavings from non-Hohokam caves that radiate out, so to speak, from the Hohokam homeland, strongly suggest that it was an outstanding center of textile manufacture. I also suspect that the Hohokam practiced a radically un-Anasazi funeral distinction between individuals, based on class or perhaps office.

To come back to the north, we do not know how, if at all, the burial customs of the Little Colorado and Rio Grande peoples were affected by the presumable influx of San Juan Anasazi DP's, when first the Chaco, later the Mesa Verde and Kayenta sites were abandoned. The newcomers seem to have brought about a quickening of culture. In the Little Colorado country there was definite elaboration of the ceramic art. This may have been due to a mixture of northern and southern influences on local wares. Be that as it may, much fine pottery went into the graves.

The effect on Rio Grande pottery of San Juan styles has already been discussed. It began well before the exodus. It is most clearly seen in the Black-on-white wares. Later came strong influence from the Little Colorado, resulting in the start of the long series of glaze-decorated ceramics. But in the Upper Rio Grande the coming of new kinds of pottery failed to stimulate their use as mortuary furniture. Neither ceramics or other sorts of imperishables went lavishly into the graves. In the Biscuit ware area more vessels, as at Otowi, were used as offerings. The people of the Pecos Valley were, from the very beginning, a parsimonious lot in material tributes to their dead, becoming more and more so from Black-on-white times onward.

One last word on this most inadequately treated subject. It concerns the seemingly habitual laying away of Anasazi dead in accumulations of refuse. Beginning in earliest Pueblo times and continuing to the establishment of Catholic cemeteries, the dead were practically always buried in midden if an adequate amount had accumulated. It has been thought that this was done because of the softness of such deposits and consequent greater ease of digging graves. I wonder. Florence Ellis, it may be remembered, has been quoted above as having found that the middens of certain, at least of the modern Pueblos, are held to be the home of Ash Boy, a supernatural being. For this reason, permission to excavate in them is usually refused. This deserves further investigation.

Burials at Length

As I have already said, this is a puzzling lot. Almost all the 59 encountered were without question late. The 47 adult and adolescent skeletons, being among the best preserved at Pecos, could all pretty confidently be sexed. Of these we noted 34 as males, 8 as females.

Some skeletons called female may in fact have been male, although 6 of the 8 females were so sexed by Hooton. He, however (1930:26-32), stresses the difficulty of sexing Pecos skeletons. He believes there was probably an excess of males over females, especially in late times, when

population was shrinking, the very period represented by practically all burials at length. Nevertheless, the excess of males in this group is obviously greater than could actually have existed. Why so? In no other phase was there a similar disproportion.

Table VIII
Burials at Length According to Age Group and Sex

	Years	No.	Male	Female	Sex?
Infant	0-3	7			7
Child	4-13	5			5
Adol.	14-19	5	2	2	1
Adult	20-"old"	42	34	8	0
Totals		59	36	10	13

These burials were, on the average, very shallow, often in the grass roots. The deeper ones--a few down as much as four feet--were, with four exceptions considered below, all in the northern part of the east midden which had been much built up, partly by dumpage, partly by wash, after the graves were dug. Indeed, most burials at length were in that midden, only 12 of the 59 being on the west and north terraces.

All but four bodies lay on the back, legs side by side, feet occasionally crossed. The arms most commonly were straight along the side, but those of 11 skeletons converged enough to bring the hands together side by side, or one over the other, at the groin. In five cases, one arm was bent at the elbow with the forearm straight across the body. Of one male, both arms were flexed, the hands on either side of the chin, but never were they crossed on the breast. In arrangement of limbs, the four face-down interments did not depart from normal. One of the deep burials not in the east midden, noted above as exceptional (Skel. 1621, ad. m., skull missing), we could be certain was early. Its grave had been sunk into the red clay to a level lower than the floor of a Black-on-white room below the west side of the plaza. The digging of a foundation trench for a wall of the room seemed to have been responsible for removal of the skull. Only Black-on-white sherds were in the grave fill. But one other adult at length was found among the crowded burials in this area (Fig. 20). He, for again it was a male (Skel. 1615), lay close to skeleton 1621, but I have no notes on the sherds in the grave. By the right leg was a Biscuit A bowl, the only pot found with any burial at length. It is therefore a question whether this vessel had been deposited at the time of interment, and the individual had lived in Glaze I or II times, or the

bowl had been found with one of the numerous nearby skeletons and been redeposited. The remaining two (Skel. 1795, ad. m.; 1796, ad. f.) were in Rooms E-VI and E-V (Fig. 20). Conditions in the deeper parts of those rooms were greatly confused, and in Room E-V were so dangerous that I could only clear the pelvis and legs of Skeleton 196 in the small hole I put down to bedrock, but I feel sure that both must be pre-Spanish, and earlier than Glaze III. In this connection, it should be noted that burial at length, although not found in any of the 152 graves opened at Forked Lightning, occurred twice among the 17 found in Guthe's limited excavation at the Black-on-white ruin at Rowe (Skels. 7 and 10, both ad. m.).

How to account for the burials at length? Aside from the four seemingly early cases just noted, and possibly some of the infants, all were evidently very late, certainly post-Spanish. This, plus the unflexed position, so foreign to prehistoric Pecos mortuary practice, and the entire absence of pottery offerings naturally point to a Catholic regime. But why the great preponderance of males? It hardly seems likely that women would have been buried apart. In the Zúñi churchyard, however, the sexes were kept separate; also at Santo Domingo; but not at Jemez. These practices are in established cemeteries, whereas these Pecos burials, even if there was a special area for women, were not in a churchyard. This brings consideration of the Catholic cemeteries at Pecos.

As has been shown (Stubbs, Ellis, and Dittert, 1957; see also Appendix III) there were three churches at Pecos--the so-called "Lost" church, in open country east of the Pueblo; the "Old" church, immediately south of and known to have antedated the "Great" church (in this report usually called the Mission); and the Mission, whose walls still stand. The "Lost" church, without much doubt, was the first. It was probably erected early in the 1600's. There is no evidence that it ever had either a convento or a cemetery. The latter important adjunct could not, as was customary, adjoin the "Lost" church because the soil about it was not sufficiently deep for graves. Furthermore, although this is pure guesswork, the Indians, for generations accustomed to burying their dead in the town's middens, might have been readier to accept a Catholic service, and a new form of interment, if these were not practices at a distance. I accordingly believe that the burials we have been discussing were made during the period of occupancy of the "Lost" church. By the time the "Old" church was erected on the mesilla, where a proper cemetery could be, and doubtless was, installed, the Indians would have become accustomed to the Catholic ritual.

Still, another possibility should not, however, be overlooked, namely that the Indians were permitted to continue their native mortuary customs until the "Old" church should be built and a regular cemetery inaugurated. This must be supposed to have been accomplished long enough before 1680 for burial at length to have become an accepted costumbre; and it must be supposed that when the Revolt took place the Pecos looted the "Old" church, abandoned its cemetery, returned to the middens for



b



p



c



a

Fig. 71. Burials: a, original rotted steps leading up to Sanctuary of Mission; b, coffins of two priests, found when steps were replaced by modern timbers; here as elsewhere, underlain and surrounded by welter of bones of Indian skeletons. Infant's coffin on step is from Mexican cemetery in exterior angle of Transept and Sanctuary; c, burial of macaw (Ara macao) at Forked Lightning; d, skeletons in steeply sloping northern part of great east midden. S. K. Lothrop with typically shallow late burial at length, older flexed burial below.

disposal of their dead, but laid them away unflexed. If so, which I think unlikely, all such interments would date from the years when the Spanish were out of the country.

Burials at the Mission

When J. L. Nusbaum was repairing and stabilizing the adobe walls of this great structure in 1915, it was necessary to dig at places below the floor in order to introduce concrete underpinnings. It was found that many burials had been made under the nave. There was some local feeling about removing skeletons from consecrated ground, particularly when two coffins containing the remains of priests came to light in front of the steps leading up to the altar (Fig. 70b). Therefore, only a few loose skulls were sent to Dr. Hooton. The priests and most other bones were reburied. Digging by tourists in succeeding years, when the Phillips Academy party was not at the site, resulted in exposing and scattering several skeletons. We accordingly felt that there would be no objection, nor was there, to our making a small excavation. I wished to recover more precise data on church burials and to add to the scanty collection of late osteological material. This was done in 1925, an area midway between both sides and ends of the nave being dug to the irregular bedrock, a depth of 4 feet 6 inches to 6 feet below the tamped adobe floor. The pit, although only 15 feet east and west by 8, north and south, yielded no less than 25 complete skeletons, 31 skulls of individuals whose graves had been disturbed by later interments, and other bones beyond counting. Of the 25 whole skeletons, 21 were of adults, 16 male, 3 female, 2 of doubtful sex; two of adolescents of 14 or 15, apparently male; two children of about 8. All had been buried at length on the back, almost all with both arms at the sides, none with hands on the breast. Four males and 1 doubtful, lay with head to the east, i. e., toward the altar, the other 21 in the opposite direction.

The skulls of Pecos Indians are often difficult to sex, but among the 28 adult "floaters" we felt that 23 were surely, and the other 5 probably, male. The age of the 3 children we estimated at 7, 11, and 12 years.

No grave was more than 4 feet deep; most were between 2 feet 6 inches and 3 feet.

Only 4 of these burials held objects. With adult males were 2 light blue glass beads, 3 dark blue and 62 white glass beads, and a wooden cross (Kidder 1932: Fig. 244b). At the pelvis of the adolescent male were 3 copper buttons; a chipped stone arrowhead was within the rib-cage. The second adolescent male was wrapped in a woolen blanket; on the chest were a bronze religious medal, small copper cross, and glass beads; with these were scraps of brocade and green silk, perhaps from a container. Other offerings, including beads, buttons, wooden and copper crosses, medals, and a framed religious picture, were found with skeletons encountered by Nusbaum in 1915.

In 1925, when these graves were opened, I had no doubt that all were of Indians. Hooton, however, in working over the few skulls found by Nusbaum in 1915, felt that at least two were of Mexicans or showed admixture of Mexican blood (1930:212, 228, Figs. V-20, 21). But the 31 "loose" skulls and those of the 25 complete skeletons were not exhumed until 1925, the skeletons of which year were not studied by Hooton. It would be interesting to determine if and how the two 1925 lots differ, because it is possible that some, at least of the 25 complete skeletons, were of Mexicans buried in the consecrated soil of the Mission after, or perhaps even before, the last Indians left Pecos in 1838 and prior to the establishment of the Catholic church at Pecos town. Just when this occurred I do not know; its records date back only to 1862 (Bandelier 1881:120). If that was the date of its founding, and the establishment of its graveyard, the local Mexicans were for at least 24 years dependent upon the Mission for consecrated ground to receive their dead.

I do not know when Mexicans began to settle in the Valley. Their town, the Plaza de Pecos of Bandelier, was never a large one. Nevertheless, there were Mexicans there as early as 1824 (Pattie 1831).

To return to the Mission burials, I believed even the 25 undisturbed skeletons to be Indian because none had the arms crossed on the breast, the position in which reposed the two priests interred before the altar steps, as did three adults, two in coffins, that lay with many Mexican infants just outside the Sanctuary. However, Fray Angelico Chavez O.F.M., whom I consulted, wrote: "I know of no ritual or Church law directing the position of the body, or of its limbs, in preparation for burial." On the other hand, he said: "That so great a number of Christian burials show the arms crossed on the breast is due to this gesture, even in life, being a symbol of piety. The arms or hands form a cross over the breast, traditional seat of life." Fray Angelico further informs me that there is no prescribed orientation.

So whether some or all the complete Mission skeletons were Mexican remains a problem for the physical anthropologist. It might also be solved by finding a surely Mexican cemetery near the Mission.

As so often before, I have to be somewhat apologetic for so lengthy a discussion of a matter perhaps not significant. But this very question might become of considerable importance during future excavations at or about Missions in the Southwest or California.

DISCUSSION

Qui s'excuse s'accuse. Of excuses I have already made a number. Still more are to come. Some of my errors and oversights were due to inexperience; most of the oversights, however, were caused by the preponderance of my interest, during the teens and early twenties, in pottery and other sorts of artifacts rather than in their makers.

I can, of course, rake up reasons for this: the purely factual nature of my anthropological education at Harvard, where archaeology and ethnology were then almost entirely unrelated; the crying need of Southwestern archaeology, when the Pecos work began, for dependable information as to the chronological and cultural relationships of the ancestral Pueblos, which Nelson (1914, 1916) had shown by his work in the Galisteo Basin, that Kroeber (1916) and Spier (1917) were demonstrating in the Zuni country, and that my own excavations in the San Juan and on the Pajarito Plateau were beginning to make clear to me (1915), could best be gained by stratigraphic and typological studies of pottery. Even along those lines I would have been much more effective had I been in possession of the results later obtained by Anna Shepard's technological study of the Pecos wares. That raised many important problems, formulated in her section of Kidder and Shepard (1936). But her investigation had not even been begun until after the fieldwork of the Pecos project had been brought to a close. Most of the new problems could only be attacked with any hope of success by the collection, with her findings clearly in mind, of further ceramic samples at Pecos and elsewhere. Materials for answering some of her queries that involved distribution of pottery types have since been gathered by Stubbs and the late Harry Mera as part of the Laboratory of Anthropology's extensive sherd survey of New Mexico. Shepard herself made good use of these in her treatise on Rio Grande glaze paint wares (1947); and Stubbs and Wendorf are ably continuing the research.

Another excuse, which I have already lugged in as an argument for the defense, was the lamentable condition of the ruin itself, which led me to pay far too little attention to the former homes of the people. But at that time its ceramic tail was beginning to wag the archaeological dog, as it has been doing in the Southwest pretty constantly since the second decade of the present century and, although to a somewhat less extent, elsewhere in the New World.

Far be it from me to decry the value of pottery to the archaeologist. Without question it provides the readiest and most reliable means for preliminary determination of culture sequences in any area where it had been made. But pottery was never more than a minor art. It can tell far less of the social and religious life of a preliterate people than can their dwellings, their ceremonial structures and paraphernalia, or the products of the higher arts. For this reason, but even more because it is both confusing and boring to wade through a morass of pottery description and

nomenclature in attempting to reach the solid ground of cultural or historical fact, one cannot blame American ethnologists or even students of the antiquities of other New World regions, for sidestepping many reports on Southwestern archaeology. That is one of the principal causes, I think, for a lack of interest, on the part of some ethnologists, not only in pottery, but in other aspects of material culture. They, as well as some pure sherd hounds among the archaeologists, seldom take advantage of the light that pottery can shed on such important qualities as technological inventiveness and artistic creativeness of the people with whom they are concerned; or, indeed, on their day to day existence, cookery, food habits.

All this, of course, is no excuse for my one-sided, perhaps better termed "pot-sided," approach to the problem of Pecos. I have much regretted, as already intimated, that I did not have the benefit there of the close association, which I later had in Yucatan and Guatemala, with men of the type of Robert Redfield and Sol Tax, who did so much to widen and diversify the interests of my archaeological colleagues and myself in the life of the Maya, ancient and modern. Not having enjoyed that great advantage, I thought, and therefore learned, far less of the Pecos as human beings than I otherwise might. In spite of that, I was beginning to see, before I left the Southwest for the Maya country, that the Pecos project must be broadened by research in fields other than routine archaeology. There resulted Carl Guthe's work on present day San Ildefonso pottery making and Elsie Parsons' sociological observations at Jemez. Another project definitely planned was a study of the documentary history of Pecos and other Rio Grande Pueblos. This, most unfortunately, was never done. But the earliest sources make it clear, as indeed does the archaeological evidence, that these Pueblos were much harassed by nonsedentary tribes.

We have already seen that Pueblo towns to the east of Pecos had all been given up during the first local Black-on-white phases; and that in the Pecos Valley itself one community after another was abandoned. Pecos alone, probably because of accretions of population from these, became large and strong enough to survive. But even Pecos was ultimately forced, without much question by enemy pressure, to adopt a new form of dwelling obviously planned for defense.

During Coronado's journey between Tiguex on the Rio Grande and Pecos, there were seen in what was probably the Galisteo Basin a Pueblo "almost deserted" and another entirely destroyed. This, it was gathered, had been the work of the Teyas, who had come raiding from the east sixteen years before (ca. 1525) and had "besieged" Pecos (Winship 1896:523-24). The Pueblo of Paa-ko, to the west of the Galisteo Basin, had been deserted, perhaps also because of hostile attacks, at the close of Glaze I. It seems more than a coincidence that the final abandonment of Loma Lothrop and Arrowhead, last outliers in the upper Pecos Valley, took place at about the same time. Paa-ko, however, was reoccupied toward the middle 1500's, not improbably by refugees from endangered towns

further east in the Galisteo Basin (Lambert 1954:6). Attacks, probably from the same direction, were still taking place there in 1591, when de Sosa found two Pueblos recently destroyed, as evidenced by many dead bodies (Hull 1916:329).

The Teya, believed to have been "Plains Apache," were certainly a constant danger to Pecos and its neighbors to the west. It would seem that their attacks had been in some force, if we are to believe that pueblos were actually destroyed by them, rather than deserted because of intolerable attrition. That Pecos or any other Pueblo was actually besieged cannot well be thought to have occurred. The investment of a stronghold was foreign to the strategy of most American Indians; nor, I imagine, was a pueblo often actually carried by storm. But sedentary farmers were singularly defensive against hit-and-run tactics, even by small hostile groups. The Teya of the period we are now concerned with possessed no horses and so were less of a menace to the eastern Pueblos than they, the Utes, and finally the Comanche, later became.

Before Comanche aggression began in the early decades of the eighteenth century, the Pecos had been able to cope with the Apache. There was trouble, of course; witness the fire in the southeastern part of the Quadrangle and the building of the defense wall. Apache depredations have been almost exclusively blamed for the giving up of much territory in other parts of the Pueblo IV and V Southwest. A great deal of this may properly be charged to them, but other causes doubtless were operative, as has been brought out by J. C. Kelley (1952) in a most important paper. In it he deals with the factors involved in the remarkable spread and subsequent shrinkage of a people practicing a Pueblo way of life, who, starting from the vicinity of El Paso, Texas, worked down the Rio Grande to below the entrance of the Rio Conchos. This occurred between about 1100 and 1400 A.D. The climate and physiographic conditions rendering agriculture possible in this long, narrow, and mostly not naturally productive stretch are painstakingly considered. In so doing, Kelley defines, I believe for the first time in Southwestern archaeological literature, the three kinds of irrigation possible in that area by people of a Pueblo or Pueblo-like culture: temporal, riverine, river diversion (idem: 358 and notes 12, 13).

The hard-won strip of land along the Rio Grande had eventually to be given up, except for the better watered La Junta region at its southern end (idem: Fig. 1). There, certain groups persisted into historic and so relatively well-documented times. The vacating of a number of these settlements led Kelley to ponder possible contributing causes. It is this part of the paper that is of special interest in relation to the fall of Pecos, also a late and peripheral settlement and likewise in contact with Apache. Kelley's discussion bears, as well, on a wide range of abandonments, including even that of the San Juan by the Anasazi.

As to the La Junta settlements, the historical accounts, derived by their writers from the natives, all attribute the desertion of towns and shrinkages of territory to Apache aggression. Strangely, however, only

two actual cases, neither disastrous, are recorded, while the same sources testify to friendly contacts, with lively trade, between villagers and Apache.

This apparent contradiction is thought by Kelley to have been due to fluctuations of climate and food supply. All went well, he believes, as long as times were good, which throughout the Southwest means adequate and well spaced rainfall, both for the raising of crops and the growth of grass for game animals. The La Junta farmers would then have had surplus corn, beans, squashes, much liked and indeed needed by the Apache. Those hunters, under such favorable conditions, were well supplied with buckskins, buffalo robes, and dried meat, all valuable economic and dietary items for the La Juntans. So there existed, sometimes for several years, what Kelley aptly terms a symbiotic relationship between nomads and villagers.

When, however, there came protracted dry spells, corn and other agricultural products ran short, often desperately so. Hunting, too, became poor and uncertain. Trade naturally ceased and tribal tempers, so to speak, also grew short. Incidents occurred. It became dangerous for Pueblos to occupy small isolated towns. Fear, rather than really severe depredations, may have resulted in the Apache being given so bad a name.

All this, as I have just said, bears significantly on happenings at Pecos. To elaborate: the country east of Pecos and the Valley itself were, like the Rio Grande down to La Junta, occupied late. Both expansions took place during the period of the widest territorial spread of agricultural life in the Southwest. Then both areas suffered contraction. In the one case, the upper part of the original Rio Grande penetration strip was given up; in the other, the eastern penetration failed to hold its own. There were left the La Junta and Pecos groups, each of which at about the same time underwent more contraction.

How much farther the parallels can be believed to hold, is problematical. The La Juntans were far more distant than was Pecos from other agricultural groups. Pecos was doubtless stronger in manpower than any single La Junta community. However, Kelley cites instances of towns coming to each other's aid in times of stress. I greatly doubt, as will be explained below, that any other Pueblo would have done the same for Pecos.

It has already been shown that before 1540 there had been serious Teya attacks on Pueblos, including the "siege" of Pecos. Others took place in 1591. Yet Castañeda says that the Teya came in the winter to trade at the "settlements," often spending some time there. They were not allowed to enter the Pueblo after dark, passing the nights "outside under the walls" (Winship 1896:524). Long visits and evidently active interchange of goods, sounds very much like the friendly relations and trade between the La Juntans and the Apache. What we do not know is whether periods of drought interrupted these mutually profitable contacts, with consequent hostilities.

Regrettably, much has been lost regarding events in the Pueblo country during the seventeenth century, through destruction of the archives at Santa Fe by the Indians in 1680. How briskly intercourse between the Pecos and the Apache continued through those years I do not know, nor to what extent the presence of the Spaniards served to keep these nomads in check. Not much, I imagine, especially after the latter acquired horses. Scholes (1942:51), indeed, believes that the Spanish themselves worsened Pueblo-Apache relations by capturing, on so-called "punitive" expeditions, Apache girls and boys for their own use as household servants or to send as gifts to their friends in Mexico.

Be that as it may, a new and even more deadly menace came with incursion into the southern plains of the Comanche. These fierce and highly mobile buffalo hunters had been forced out of their former range in what is now southern Wyoming by other tribes, and worked south on the east side of the Rockies. They soon displaced the Apache on the Taos-Picuris-Pecos front. In fact, many Apache came for protection to live among the Spanish settlements. The Utes, formerly very troublesome, grew more tractable because of their fear of these newcomers.

The Comanche soon became a terrible scourge, not only to the eastern Pueblos and their Mexican neighbors, but also to frontier Texas and the towns of northern Chihuahua. At Pecos they first made themselves felt in 1716. From then on, came intermittent raids. There are numerous accounts of serious disasters for which they were responsible, or possibly several different accounts of the same calamities. One, already mentioned in connection with irrigation by the Pecos, tells of workers on a ditch being all killed. Another, current in the Valley in my time and either recounted to or read of by Bandelier (1881:124) was to the effect that the Pecos, exasperated by continuous Comanche aggression, undertook a retaliatory expedition with their entire active manpower. They were said to have been ambushed and slaughtered, with but a single survivor. This occurred, Lange believes (1957:162), about 1750. If these stories are correct it must have been almost a deathblow to the already much weakened community.

To the Comanche has generally been attributed the downfall of Pecos and there can be no doubt that they played a part, it may have been the principal one, in bringing to an end the independent existence of that once large and flourishing Pueblo. In spite of this, we have little specific information as to the relations between them and the Pecos during the more than a century between the Comanche's first appearance and the final abandonment of the Pueblo in 1838. But it is certain that there was considerable contact other than hostile, some obviously friendly, as J. P. Harrington (1916:478) states that there was much Comanche blood among the Pecos and that many spoke the language. Toward the end, the Comanche seem to have ceased to be a menace, possibly because of these closer relations or because the dying Pueblo was not worth raiding. In 1811 it had but 30 fighting men, in 1820 the total population numbered only 58 (Twitchell 1911:474, note 506). Thus reduced, the town could easily have

been overwhelmed and the Comanche apparently turned their attention to the Mexican settlements, which offered better loot, especially horses. An instance of this occurred in 1824, when they raided Mexican ranches in the Valley, carrying off the Governor's daughter and an older woman. American trappers headed by J. O. Pattie and his father, who were in Santa Fe, volunteered to attempt a rescue, managed to get ahead of the Comanche, ambushed them, and saved the girl (Pattie 1831).

As to the Comanche at Taos, more data are available. Much is to be learned from Bishop Tamarón's account of his visitation of 1760 (Adams 1954) and from Dominguez' report on the Missions of New Mexico in 1776 (Adams and Chavez 1956). Both tell of lively trade. Dominguez says that the Comanche are "extremely good when they are in the mood." And: "When they are on their good behavior or at peace, they enter Taos to trade. At this fair they sell buffalo hides, 'white elkskins,' horses, mules, buffalo meat, pagan Indians (of both sexes, children and adults) whom they capture from other nations." They also offered, according to Dominguez, firearms and ammunition, as well as various objects of metal, acquired through other tribes from the French. To the Comanche the Taos supplied corn, ground or unground, bridles, red cloth, fancy garments, receiving in exchange everything from hides to slaves (*idem*: 252). Bishop Tamarón (Adams 1954: 56-62) also writes of this barter, as of 1760. He adds: "The character of these Comanches is such that while they are peacefully trading at Taos, others of their nation make warlike attacks on some distant pueblo." The Bishop further quotes at length from a letter written him by the interim governor of New Mexico regarding a raid in 1760 by a large body of these Indians. This, Dominguez says, was intended to wipe out the Pueblo because the Taos had flaunted and their women had indecently insulted some Comanche scalps. That may be true, although the explanation strikes me as savoring of an excuse, and the actual attack was not on the pueblo, but on a large house in which a number of Spanish had taken refuge.

The Comanche without question rightly earned a bad name. Nevertheless, the worst of their depredations seem to have taken place in the 1770's, which followed a series of dry years, from which the Pueblos were still suffering and during which they were but slowly recovering from a very severe epidemic of smallpox that raged throughout the Pueblo world in 1760. There was another in 1779, when Pecos was so much reduced that it no longer was served by a resident priest, becoming a *visita* of Santa Fe (Twitchell 1911, Vol. II: 450). In 1774 a drought caused "scarcity in most of the kingdom," many "poor wretches" from other towns coming for help to Taos, whose perennial stream had permitted irrigation and a good crop. In 1776 there was more trouble, Galisteo, being dependent on rain, endured "deplorable poverty" (Adams and Chavez 1956: 112, 217). Thus, although we do not know how greatly such unfavorable conditions affected the Comanche, they rendered the Pueblos easier prey than ever to these merciless raiders, who struck Sandia in 1775, and Albuquerque in 1777 (*idem*: 143, 154).

None of this, of course, exactly duplicated what Kelley, I believe with reason, thinks may have taken place far to the south on the Rio Grande, but the parallels, both in the circumstances and what we know of the events in both theaters, are striking. The La Junta episode should be taken seriously into account by historians and anthropologists in considering the Pecos problem and others concerning Pueblo-nomad relations.

Because of the foregoing I hesitate to assign full responsibility for Pecos' extinction to Comanche hostility, whether it was due to pure "cursedness" and a Viking-like love of raiding, or because they had developed a lasting desire for what, in better times, the Pecos could supply them. Contagious diseases, brought into the New World by the Spanish or their Negro slaves, must have been a potent element in the decline. "Mountain fever," whatever that may have been, and pollution of their drinking water by drainage from the Mission cemetery, have been cited by Hewett (1904). The latter could certainly not have occurred, for even could noxious organisms have reached the surface from adobe-filled graves, no run off from the Mission area reaches the spring in the Arroyo del Pueblo from which the Pecos doubtless supplied themselves. By and large, the failure of the town is, in the present state of our knowledge, impossible to explain. Taos and Picuris, almost equally open to raids from the Plains, both survived. One is inclined to look for some less obvious cause, perhaps some inner defect. This cannot usefully be discussed, however, until certain characteristics of Pecos culture and the relation of Pecos to some other Pueblos have been made as clear as the paucity of our information allows.

The Pecos of the 1500's were a successful people, to judge from the size of their pueblo and the number of its inhabitants. Castañeda's statement that the town could muster five hundred fighting men may have been a bit of an overestimate, but Benavides, writing in the early 1600's, says that it held over two thousand souls. There is little doubt that it was the largest community of the Upper Rio Grande at that or any earlier time and, during the fifteenth to seventeenth centuries, perhaps the most populous of the entire Southwest, for the Hopi, then as now, were divided among several villages and the Zuñi had not yet drawn together into a single town. Pecos' physical environment was as favorable as that of most Pueblos and far better than that of many. Its position athwart the easiest route from the Pueblo country to the Plains was surely advantageous for trade. For example, buffalo skins, robes and caps, rawhide shields, were among the articles brought by the Pecos as gifts to Coronado on his arrival in the Zuñi country. They may have been more or less monopolistic middlemen for the westward diffusion of these valuable goods. This is strongly suggested by the abundance at Pecos, particularly in Glaze V and later deposits, of certain artifacts of eastern derivation: snub-nosed scrapers, two- and four-edged chipped knives, hide-painting tools of cancellous bone, end-scrapers of bone (Kidder 1932: passim). All these are rare or absent from sites further west, even in

the nearby Galisteo Basin (personal communication from N. C. Nelson and see Lambert 1954). What the Pecos supplied in exchange is less evident. Pottery was of little use to nomadic peoples and very limited numbers of sherds have been found at eastern sites. Turquoise seems not to have been favored eastward of the Pueblo range. Nor, one would think, were textiles much needed in the Plains. Indeed, it seems unlikely that the Pecos, who had to import all their cotton, were prolific weavers. So one must suppose that, as at Taos, farm products were their principal export commodities, plus certain amounts of Spanish goods.

Aside from the few above-mentioned artifacts, developed and probably made in the Plains for the dressing of hides, the material culture of Pecos from about 1300 to 1600 seems to have been much the same as that of the handful of contemporary eastern Pueblos whose pottery, implements, and weapons have adequately been described, although Pecos appears to have surpassed other towns in the number and beauty of its spirally grooved fibrolite axes. But during the 1600's Pecos alone, so far as we now know, possessed many human figurines and little bells, both of clay. Another peculiarity of Pecos is that clay pipes are far commoner and more exuberant there than at other Upper Rio Grande sites that have been excavated, although some of their relatively rare pipes duplicate those of Pecos both in shape and in ritualistic decorations: crook, lightning arrow, rain-cloud, horned serpent (Kidder 1932:112-182).

Thus, Pecos in its prime, was richer in certain ways than Pueblos of the Galisteo Basin, the Jemez country, or the Pajarito Plateau. How it compared with towns of the Picuris-Taos area in late prehistoric and early historic times we have no idea, no northern ruin of those days having yet been investigated. This is a serious lack.

Comparative data as to material culture are scanty enough, but greatly exceed what can be gathered from the literature concerning Pecos' relationship to other Upper Rio Grande Pueblos in the matter of social organization, ceremonial life, or the disposition of its people. In the latter connection, we should give thought to the non-material traits which Parsons (1936:117) has listed as pronouncedly Puebloan: standardization striven for in all things, individualization not sought, personal distinction shunned, self-assertiveness decried. She was writing of Taos, where she found these attitudes enough tinged by individualism and, under certain circumstances, even by most un-Puebloan boastfulness, to make her suspect influence from eastern nomads, who differ in such particulars so radically from the townsmen. This leads me to wonder whether the Pecos, also on the extreme eastern frontier of the Pueblo world, might not have undergone similar "contamination." They are said by Castañeda to have declared that they could conquer any Pueblo they wished. This certainly sounds boastful. On the other hand, their willingness to put up for so long a time with what I cannot fail to believe was very rigid control of housing argues for adherence to the principles stressed by Parsons. I greatly wish we knew more of domestic arrangements at Taos.

Castañeda's reference to conquest raises the interesting question of

inter-Pueblo relationships. "Conquest," in the sense of the defeat of another group, followed by its subjugation, with tribute in goods or services, never took place, as far as there is any evidence, in the Southwest. During the post-Columbian centuries, and I believe long before, there had unquestionably been, at times, severe pressure on the Pueblos by nomadic tribes. This sometimes led to concentrations, as in the Pecos Valley, but I know of no record or legend of effective defensive alliances in the Upper Rio Grande. Nevertheless, the constant menace of savage enemies should, one would think, have given the farming peoples a feeling of solidarity and kept them from often warring with each other. Yet trouble there was. Other Hopi destroyed Awatovi. After the Pueblo Revolt of 1680 there was considerable inter-Pueblo fighting in which the Pecos were involved with the Tano, their neighbors to the west. Awatovi, it would seem, suffered because it had favored the return of the missionaries after the reconquest of 1690-'93. The Pecos-Tano strife, may have had causes connected in some way with post-Revolt politics; probably there had previously been some bad blood.

The Pecos claimed, according to Bandelier (1881:121) to have been neutral on the fatal 10th of August, 1680. This he believed, but that they actually were far from neutral is evidenced by the fact that they were among the first to take part in the attack on Santa Fe. Nevertheless, when de Vargas undertook the reconquest of New Mexico in 1692 the Pecos, who temporarily abandoned their pueblo, shortly returned and offered no resistance.

From then on they not only caused no trouble, but supplied de Vargas with a strong force of fighting men to aid him in the subjugation of revolting towns, mostly Tewa, during the troublous mid-1690's. And when emissaries came from other Pueblos to urge renewed reprisings, the Pecos governor, Juan Gé, had some of them summarily killed, turning others over to de Vargas for questioning and, of course, ultimate execution. This pro-Spanish attitude could not have rendered the Pecos popular with other Pueblos. Self-seeking and, certainly in the eyes of their neighbors, treacherous they doubtless were; also politically inept, in common with most other American Indians, who again and again not only allowed intertribal animosities to prevent effective coalitions, but almost always were eager disastrously to ally themselves with this or that European invader to gain with their help a worse than useless advantage over a far less dangerous native foe.

Faced by present-day world conditions, it ill-becomes modern man to belittle the social or political sagacity of any earlier people. On the other hand, historians and anthropologists should not allow sentiment to blind them to the faults of those whom they study, or unduly to exalt their virtues.

I think I probably would not have spoken as deprecatingly of the Pecos as I just have, were it not that I recently reread J. W. Bennett's (1946) thoughtful and closely reasoned paper on two strongly differing interpretations of the same Pueblo culture. In it he shows how strongly the judge-

ment of anthropologists can be influenced in one way or another by subjective evaluations. I quote briefly from his presentation of the cases on which he bases his discussion. The position of what may be called the Laura Thompson school, he summarizes thus: "Pueblo [Hopi] culture and society are integrated to an unusual degree, all sectors being bound together by a consistent, harmonious set of values, which pervade and homogenize the categories of world view, ritual art, social organization, economic activity, and social control. Man is believed to have the ability to act freely and voluntarily in ordering his own affairs and fitting them into an harmonious universe." Of the Goldfrank school's very different position, arrived at by nearly contemporaneous field observations of the same people that Thompson studied and of the literature concerning them, he says: "Pueblo society and culture are marked by considerable covert tension, suspicion, anxiety, hostility, fear, and ambition. Children despite a....gentle....early training, are later coerced subtly and (from our viewpoint) brutally into behaving according to Pueblo norms. The ideals of free democratic election and expression are conspicuously lacking in Pueblo society, with authority in the hands of the group and chiefs, the latter formerly holding the power of life and death....."

Bennett takes no stand, pro or con. He ascribes the two very unlike opinions to differing preferences and values. But one can read between the lines, I think, that he tends to be Goldfrankian as, in spite of the careful impartiality of his presentation, I certainly am. This has given me pause, for in thinking over what I have earlier said of the Pecos, I realize how much my favorable opinion of them reflected the keen interest and satisfaction I derived from my years of work on their antiquities. To say nothing of my love for the country in which they lived.

Unfortunately, we have no first-hand account of what the Pecos were actually like. As a matter of fact, we really know very little beyond the most obvious externals, of the still extant eastern Pueblos, because through the years, first of Spanish priestly repression and later of American regulation, these people have become adept at concealing from any White investigator their true selves and especially everything connected with non-Catholic religious rites. This self-containment and self-sufficiency played, I believe, no small part in saving the Pueblos from the spiritual and material decadence that has overtaken so many other Indians. But they possess very little spirit of inter-Pueblo solidarity, which in earlier times might have allowed them more successfully to have resisted savage enemies. The same lack of cohesiveness today causes much difficulty to those who try to bring Pueblos together for common betterments of one sort or another.

Pecos perished. Why this once great Pueblo failed to survive is, as I have said, a problem. The community was already on the down grade, as indicated by its dwindling population in the first half of the eighteenth century, seemingly before the legendary ambush and slaughter of the expedition against the Comanche. As a matter of fact, in thinking the thing over, I have come to wonder very much if a foray manned by the entire

fighting strength of the Pueblo could actually have ever set forth. Organized military action seems most un-Puebloan. And where and how could the Pecos have hoped to surprise and overcome so elusive a foe? The original account of the episode, doubtless exaggerated in telling and retelling, I think not improbably dealt with a somewhat lesser disaster which may have overtaken some party of Pecos buffalo hunters who had ventured too far or too incautiously into Comanche country. Admitting that it perhaps was a costly reverse, I cannot believe it to have been more than one of the probably many adversities that brought about the ultimate collapse.

Were internal rifts partly to blame? Titiev (1944) has shown in his discussion of Oraibi's disintegration that Pueblo communities have been, and still are, prone to damaging intramural feuds. Or had droughts, epidemics, and other tribulations resulted in the Pecos losing heart, with their women ceasing to have babies, as Juan Gonzales once feared might happen at San Ildefonso? Or was there a slow, weakening drainage of discouraged or disgruntled individuals or groups, seeking less worrisome lives in other towns? People claiming Pecos ancestry have been reported now living in the Pueblos of Santo Domingo, Cochiti, San Felipe; also by Simpson (1850:69) at Cuesta and the "Cañon de Pecos." This of course shows that desertions had been going on for some time before the pitiful remnant finally took refuge at Jemez.

Bandelier and Hewett both believed that the twenty souls left in 1838 had been invited by the Jemez to join them. But J. P. Harrington states (1916:477) that according to a Jemez tradition the Pecos survivors first went to Sandia "where they were well received and lived for a few days, but finding that they could not get on well with the Sandia people, they went to Jemez. . . . Why the Pecos refugees did not go directly to Jemez is difficult to understand, for the Pecos and Jemez languages are as closely related as Danish and Swedish, while the Sandia language. . . is unintelligible to a Pecos." Once again to question a legendary account, I wonder if what was told Harrington did not grow from a memory of the Pecos having broken their journey at Sandia for a rest, as they might well have done had they come across the Galisteo Basin and been planning to follow up the Jemez River to their destination. The statement that they failed to "get on" at Sandia might merely have had to do with differences in speech.

No thorough research has been done, or at least published, on the Towa language of Jemez. Of the only other Towa dialect, that spoken at Pecos, little or nothing is known. No one could probably have got much reliable information, I should think, or a very pure vocabulary, from second or third generation Pecos descendants at Jemez, who had doubtless heard and spoken nothing but Jemez Towa all their lives. Hence a glottochronological comparison of the two tongues presumably cannot now yield data on how long they had been separated. I do not suppose this could have been a great many centuries, for Harrington's remark that they were as alike as Danish and Swedish, evidently based on what little

evidence that indefatigable linguist could gather, does not suggest very great diversity. Dominguez (Adams and Chavez 1956:181), speaking of the Jemez of 1776, says that their language "conforms" to that of Pecos. The governor of Jemez told Simpson (1850:68) that his people and the Pecos spoke the "same tongue."

I have stressed this matter because it is evident--Dominguez actually says so--that the two Pueblos were, save in speech, quite unlike. Parsons (1925:129) was not greatly surprised by this because of her belief "that similarity in language is far from involving similarity in social habits." She notes and discusses various tangibles and intangibles brought to Jemez from Pecos: the image of Nuestra Señora de Prociungula, the "Pecos Bull," certain fetishes and masks, as well as esoteric societies such as the Eagle Watchers. All these strengthened her feeling that the culture of an immigrant group may be expected to persist primarily in the ceremonial life. Even so, the Jemez evidently did not wholeheartedly take over all Pecos cults, for Parsons received the impression that there existed something of a cleavage in ritual organization between the Pecos descendants and the Jemez, as one of the former, in speaking of such matters, told her scornfully "these Jemez don't know anything" (*idem*:135). As far back as the middle of the last century the governor of Jemez informed Simpson (1850:68) that the Jemez and Pecos "differed somewhat in their religious customs."

As to social practices, one can make no valid comparisons; firstly, on account of our ignorance regarding those of Pecos; secondly, because Jemez diverges widely from all its Tanoan linguistic "cousins," according to Parsons (1925), Hawley (1937), and Eggan (1950), having become strongly acculturated socially from the west. This is not surprising, for Jemez has long been tucked in, so to speak, among Keresan, *i.e.*, "western," towns. Much of the social set-up of Jemez cannot, therefore, be considered to have obtained at Pecos, particularly in view of the latter's extreme eastern situation, coupled with all the above-mentioned students' belief in a marked social dichotomy of the Pueblo world as between east and west.

The history of the two Pueblos has also been strikingly dissimilar, the Jemez having again and again deserted their several towns and taken refuge in the mountains during and after the reconquest by de Vargas. Pecos, on the other hand, was less upset than almost any other eastern town at the time of or subsequent to the Revolt. So disturbed a career might well have tended to break down earlier systems and so have left the Jemez unusually open to acculturation from its Keresan neighbors.

In the matter of architecture and artifacts we are on firmer ground, because a comparison of the two peoples under discussion can be based on published archaeological material, that of the Jemez from Unshagi, excellently presented by Reiter (1938), that of the Pecos in various papers of Phillips Academy.

The kivas of Unshagi and Giusewa were round, sub-surface, and not greatly unlike those at Pecos, except that the ventilators of two of the

three excavated at Unshagi opened south, the other south of east; one at least at Giusewa also opened south. It will be recalled that all Pecos round kivas opened east. At Jemez today, are but two kivas, both above-ground, rectangular, and adorned with wall paintings, thus radically unlike those at Pecos. When Parsons was at Jemez in 1921 and '22, both kivas were "undetached," whereas at some time since then the houses on either side of the southern, or "Squash," kiva have disappeared and it now stands by itself (Stubbs 1950:Pl. XI).

The architecture of the Unshagi pueblo included elements strikingly different from anything seen at Pecos, in the form of long lines of "Class C" rooms with bins, terraced deflectors, and ventilators (Reiter 1938: Fig. 4). On these I have commented in an earlier section and called attention to the very similar rooms in the supposedly much earlier Gallina ruins. Minor artifacts of Unshagi were unspectacular, but aside from the rarity and crudity of pipes, the lack of figurines and of the eastern hide-dressing tools, they do not differ markedly from Pecos products. Ceramically, however, Unshagi and evidently other Jemez Pueblo IV and V sites stand clearly apart from Pecos or other contemporaneous ruins of the Upper Rio Grande. This is brought out in Anna Shepard's study of some 2000 sherds from Unshagi (*idem*: Appendix IV). The leading ware is Jemez Black-on-white, exclusively tuff tempered and ornamented with dull organic paint. In vessel shape and in decoration it bears no resemblance to the likewise tuff-tempered Biscuit ware, also with organic paint, which Shepard has shown to have reached Pecos in trade from the Biscuit focus of the Northern Pajarito and Chama areas. Extraordinarily enough, in view of the propinquity of that focus, Biscuit sherds were of the most extreme rarity at Jemez (*idem*: Appendix I). Glaze-decorated pottery, although better represented than Biscuit, is distinctly uncommon at Jemez. From the nature of its temper, Shepard believes that none was made there. She found but one sand-tempered sherd that might have come from Pecos. Nor did Pecos acquire pottery from Jemez, for among the hundreds of thousands of sherds examined there, we found no single fragment of the easily recognizable Jemez Black-on-white. That ware seems not to have been popular anywhere away from home. Morley and I evidently found none at Puyé or Tyuonyi, for my field notes make no mention of any dull-paint ware other than Biscuit. Hendron (1940: 26) discovered only two fragments of Jemez Black-on-white among the 11,000 sherds he recovered from deposits at the great kiva east of Tyuonyi. It sounds like a boycott. But the Pecos had never been adverse to importing pottery, at times in large quantities. During Forked Lightning days, much St. Johns Polychrome came in from the west, presumably the Little Colorado. During Glaze I they drew heavily on the Pueblos of the nearby Galisteo Basin. Biscuit they got from the north and it was popular at Pecos for a long time. Two interesting pottery imports were Jeddito Yellow and Sikyatki Polychrome, a pair of chronologically sequent types which I supposed, when they turned up in considerable quantities in Glaze III and IV deposits, to have been brought directly from the distant Hopi

Pueblos of central Arizona. They must, I think, have been made there, but both could have been had from people living at the much nearer Pottery Mound, a ruin on the Rio Puerco of the East near Los Lunas, New Mexico. That site, some of whose kivas bear remarkable ritual paintings and on the surface of which I saw, years ago, surprising amounts of Jeddito Yellow and Sikyaki Polychrome is now being excavated by Frank H. Hibben of the University of New Mexico. His reports should be of great interest because of the part the people of Pottery Mound may have played in forwarding the strong eastward current of trade that carried Hopi pottery clear to Pecos. It will also be important to have the Pottery Mound kiva murals for comparison with those of Kuaua and Jemez. Was ritual painting of the walls of rectangular kivas, so much practiced at Awatovi and Kawaika-a in the Hopi country, carried eastward to them as part of the same eastward expansion? Most fortunately, for help in attack on that problem, we have the compendious work of Watson Smith (1952) on the Hopi and other murals. We can also look forward to that meticulous and wide-visioned student's forthcoming study of Awatovi pottery and related wares, which should serve to straighten out many ceramic tangles.

To sum up, Jemez is relatively well known both ethnologically and archaeologically from the writings of Reagan, Parsons, Florence Ellis, and Reiter. Their observations show that aside from common use of the Towa language Jemez and Pecos were extraordinarily unlike. Of the extent of dialectic difference between the two we are ignorant, but I think, from the historical references, it was probably not great. We also possess, in spite of their extreme reticence, a good deal of information on the present and the past of the Tewa Pueblos, Pecos' neighbors to the west and northwest. But of Taos we know very little indeed. Its people are, if possible, even more loath to communicate anything regarding their civil and religious life than are the Tewa; and as to the archaeology of the Taos country we so far have only Jeançon (1929) on a single Pueblo III ruin. But Helen Blumenstein (1956) reports excavations, not yet published, in pit houses and a Pueblo III pueblo. However, it seems likely that Wendorf shortly will attack the archaeological problems of the area with adequate means. As to Picuris, we are in even worse case and, so far as I am aware, there is no hope in sight.

It seems to me essential, from my strongly pro-Pecos standpoint, that much more should be learned of Taos and Picuris. Both, as has already been emphasized, were, with Pecos, on the extreme eastern Pueblo frontier. The Picuris, indeed, deserted their pueblo in 1704 to escape Spanish control and joined a group of Jicarilla Apache at Quartejejo, supposed to have been somewhere in Kansas. After two years they were induced to return. A half century earlier some Taos families had also lived temporarily with the Jicarilla. These and other Plains contacts resulted, Parsons doubtless rightly believed, in the un-Puebloan deviations in disposition already noted, which I felt might similarly have affected the Pecos. Nevertheless, the Taos Council has tried to preserve classic Pueblo

traits, severely punishing boastful, self-assertive conduct. But in attempt to accomplish this "they have had to jail, whip, fine, and confiscate to a degree unparalleled in other Pueblo circles where fear of gossip or ridicule is adequate compulsion to conformity." (Parsons 1936:17). Her Chapter VI, "Attitudes and Trends," in which she also speculates on the future of Taos, should be read by all who have to do, officially or anthropologically, with any Pueblo.

To return to the Taos-Pecos relationship, they differed greatly in their dealings with the Spanish. The Pecos, as we have seen, gave no trouble after de Vargas' reconquest, whereas the Taos were up in arms in 1693 and again in 1694. In 1696 they took a leading part in an uprising of the northern Pueblos in which five missionaries and over a score of Spanish civilians were killed. Taos warriors were active in the Mexican-fomented "Taos rebellion" of 1847 in which Governor Charles Bent and numerous other Americans lost their lives.

The Taos long were and still are at odds with their close neighbors and fellow Tiwa speakers, the Picuris. "Some of the scalps in the Taos collection are from Picuris," says Parsons (*idem*:12).

Pecos and Taos, with Picuris, are the only Pueblos that retained multiple, round subsurface kivas. This sets the three strikingly apart from all other towns of the Upper Rio Grande, which had only two, some round, some rectangular, always aboveground, sometimes incorporated in the house clusters. In the Taos ceremonial setup, its six kivas are in two groups of three, North Side and South Side, each kiva with its own chief, each group presided over by the chief of one of its three. Pecos also had a number of round, subsurface kivas, but although we know that some were in use until or very close to the abandonment, we did not learn, because not all were excavated, how many were occupied at any given time. Thus, whether or not there was a dual grouping of the Taos type, we cannot say.

Altogether, the two Pueblos were apparently not as much alike as I thought them to have been before I began digging into Parsons on Taos. How fervently I have wished that someone with her interests and her pen had been there and at Pecos with Coronado! But I should have wanted my sixteenth century Parsons, when at Taos, to have been a little more interested in weapons and tools and ornaments. Of such things at Pecos we know about as much as one is ever likely to learn from a site open to the weather and that had not been left wrecked by an enemy. But of the material culture of Taos and Picuris practically nothing! Whether or not the Plains types of skin-dressing tools were used there is unknown. Nor are there at all adequate data on pottery. Shepard (1942:165) found an unusual temper, arcose sand, in the few Picuris glaze sherds in the Laboratory collection; there were but 8 from Taos, 5 tempered with sand that had no "distinguishing characteristic." Mera (1935, 1940) was unable to secure any really useful information.

More collecting is of course badly needed, but I fear that the mounds of the earlier Taos, only a few hundred yards northeast of the present

Pueblo and, like it, on both sides of the river, are so close that it may be a long time before any archaeologist will be allowed to sink an inquisitive shovel into its middens.

To attempt even guesses at this time as to what if any resemblance existed between eighteenth century Pecos and the two northern Tiwa Pueblos would be futile. Many seemingly well founded speculations as to other American cultures have of recent years been proved in part or even completely erroneous. For this there have been a variety of causes: greater arrays of new facts, improved field methods, dendrochronological and radiocarbon dates. The result has been that archaeologists have rightly become increasingly cautious. Few oldsters would deny that they actually know less today of what went on in the pre-Columbian New World than they were quite certain they did twenty or thirty years ago. I notice, too, that not a few of the younger crop end their papers: "This excavation has raised more problems than it has solved." But that, of course, is what gives excavation and digging the lure they have, and adds to the solid satisfaction of arriving at conclusions which one can reasonably feel confident are correct.

In 1924 I thought I knew a good deal about the Southwest in general, and Pecos, in particular. The pages, especially the last few, of the present belated contribution show how very wrong I was. But, I flatter myself, I was not nearly as wrong as was he who advised me, just 50 years ago, to take up work in another field because, he said: "The Southwest is a sucked orange."

I only wish I could return to that wonderful country and wet my aged lips once again in the rich juice of a fruit which a half-century of research has little more than begun to tap.

A P P E N D I C E S

APPENDIX I

Title to Pecos Pueblo and Mission

In the first volume of the Pecos series I mistakenly stated that title to the site had been presented to the State Museum of New Mexico by Mr. Harry Kelly of Gross-Kelly and Company of Las Vegas (Kidder 1924:1, 2). I have now learned that in 1915 Mr. (H. W.) Kelly, his wife (Ellis T. Kelly) and Gross-Kelly and Company deeded the Mission of Pecos and some 80 acres of the land surrounding it to the Very Rev. A. T. Daeger, Roman Catholic Archbishop of the Archdiocese of Santa Fe. This they did because they felt that they had no right to give away Church property. The Kellys, however, suggested to the Archbishop that the parcel be deeded to the Board of Regents of the Museum of New Mexico and the Board of Managers of the School of American Research. This was done.

APPENDIX II

Extracts from Pecos Censuses of 1750, 1790

The 1750 census of Pecos was found by F. V. Scholes in the Biblioteca Nacional, Mexico City, Legajo 8, No. 81. It was compiled by Fr. Francisco de la Concepción Gonzalez.

Population, 450. Adults are listed by name, practically all, both males and females, bear a Spanish given name followed by an Indian name. Each entry is preceded by the number of children.

Heading the roster are:

3 Agustín (no Indian name) el Cacique y su Mujer, Juana Echaru

1 Gobernador Antonio Pousiu, Juana Ambsui

These are the only individuals whose position is stated. A few typical entries follow:

2 Agustín Guocho, Catharina Hipipi

0 Cristobal Guocandari, Angelina Ujecheyu

2 Juana Suguobi, viuda

0 Maria Undepa, viuda

Of the 450 souls, 99 were couples, 73 with 136 children, average 1.86 per couple, or 1.39 if the 26 childless couples are included. One couple had 6 children, one 5, three 4. One pair of lone males was listed as a "family." There were 44 widows, 29 with 58 children, average 2, or 1.34 if the 15 childless widows are included. One widow had 6 children, two had 4. Widowers were 9, one with 1 child.

The status of the large number of widows is problematical; was viuda a courtesy designation for a number of these women, whose husbands had made other arrangements; or were most of them relicts of men lost in one or another of the reported, but unfortunately not datable, catastrophies of Comanche warfare?

The 1790 census (Spanish Archives of New Mexico, Sec. 1096a) is signed, with rubric, by Antonio José Ortiz, Alcalde Mayor, and Fr. Severo Patero, Ministro, both of the jurisdiction of Santa Fe.

Population 154, a shocking shrinkage of 296 in the 40 years since 1750. The list is very differently arranged: all persons bear only Spanish names, sometimes both given and family, much more often only given. The ages of children, as well as adults, are entered, together with size of each of the 56 "families."

Typical listings:

Agustin, de 28 años, casado con Maria de 20, un hijo de 3 años....3

Santiago, de 34 años, casado con Gertrudis de 26 años, dos hijas de 9, 2 años....4

Other relatives are occasionally included: 4 nephews, 1 sister, 1 sister-in-law, 1 uncle, 2 mothers-in-law. Of the 154 souls, 41 were couples,

26 with 41 children, an average of just short of 1.58, or exactly 1 if the 15 childless couples are included. Widows, 7, of whom 2 were mothers-in-law living with married couples--in one case, the man was her son; in the other, which of the pair was her child is not clear--another widow was a widower's sister; 2 of the remaining 4 widows had 2 children each, 2 were childless. Widowers, 7, all childless but 1, who had 1 son. Only 1 bachelor appears; he, like 4 of the widows and all the widowers, is listed as one of the "families."

A further probable indication of the decline of the Pueblo is that there is included a Spanish widower of 77, Don José Mares, with a 13 year old son, doubtless the child of a Pecos woman. He heads the list and is followed by three other married men with full Spanish names but lacking the honorific "Don"; José Miguel de la Peña, Juan Domingo, Tomás de Sena. Miss Adams suspects that these may also be Spaniards with Indian wives. Juan Domingo, however, is a name applied no less than five times further on to men who were doubtless Indians.

APPENDIX III

The Problem of the Pecos Missions

That any problem existed was not realized until there was published "The Missions of New Mexico, 1776" (Adams and Chavez 1956). But a serious question was at once raised by this full and painstaking account of ecclesiastical conditions in that province by the Franciscan Commissary Visitor, Fray Francisco Atanasio Dominguez. Everyone, I think, had formerly believed, as certainly did Bandelier, Bloom, Scholes, and Kubler that the Mission, whose massive adobe walls still dominate the Pecos mesilla, was the same structure which in 1630 was so proudly called by Benavides a "Templo muy luzido." Had that been the case, it must of course have been built early in the seventeenth century; Bandelier thought by 1617.

Bandelier (1881:88, Fig. X of Pl. V) had noted: "About a quarter mile east [actually northeast] of the building A....the foundations of a singular ruin." He suspected from its form that it had been a Christian chapel, erected, or perhaps only in course of erection, before 1680. He continues: "Not only is it completely razed, but even the material of the superstructure seems to have been carried off."

I paid little more attention to this foundation than had Bandelier, but I did have a new plan of it made, as it was evident that his--I'm sure drawn by someone far less conscientious--had only the vaguest resemblance to the original. By a little digging, I found evidence that adobes had been laid on the flat stones of the foundation. I also recovered a few sherds, the latest being thin-rimmed Glaze V.

Because of the lack of refuse, I accepted Bandelier's suggestion that the building might never have been completed. I thought, however, that it represented a start to erect the first Pecos church, but that for some reason, possibly distance from the pueblo, the project was given up and the site for the Mission transferred to the mesilla. So no further thought was given to the matter until 1956.

The Dominguez report, appearing in that year, described an "old" and much dilapidated church, incorporated into the convento immediately south of the great Mission. The existence of this totally unexpected earlier structure led both Stubbs and me to wonder about the above-mentioned foundation. Accordingly, Stubbs with Bruce T. Ellis undertook the excavation of the latter, while Alfred E. Dittert, Jr. examined an interesting nearby Indian shrine (Stubbs, Ellis, and Dittert 1957). In the report on the remains of the structure, which we took to calling the "Lost" church, Stubbs records its excavation, Ellis discusses its history. Their paper is so clear and so fully illustrated with plans, sections, and tentative reconstructions that only the briefest summary need here be included.

The building was obviously a church. It had been finished and roofed

and had been in use for at least some time, as heavy buttresses were added after the original construction to support the west wall. It had been completely razed to its well-laid stone foundations, which, however, in places retained a few of the lowest adobes of the walls. They averaged 20 by 9 by 2 3/4 inches and were laid in "distinctive dark red" adobe mortar. Some 250 identical adobes were found neatly stacked in the sacristy, a presumably unfinished addition, as its interior had not been plastered, as had both sides of the main church walls. Although some of the stacked adobes bore what might have been wall mortar, many others were as clean and had edges as sharp as if piled unused, fresh from the mold. There was no structure at or near the "Lost" church that could have been a convento; there lacked sufficient soil for a cemetery, and in spite of careful search no object of non-native manufacture (china, glass, metal) could be found.

After Stubbs and Ellis had weighed all the evidence, archaeological and historical, Ellis presented their "tenuous and wholly inferential" opinion as to the succession of the three churches as follows. The "Lost" church was built not later than during the first two decades of the 1600's. It was, they felt, occupied for only a short time (unfinished sacristy with unused adobes, utter lack of non-Indian objects, absence of convento or cemetery). Its unfavorable situation for defense probably led to its abandonment, with reuse of its roof timbers and adobes (some of the latter formed the second floor of Kiva 7; others were found by Stubbs in a room of the South Pueblo). The "Old" church of Dominguez was erected at an unknown, but relatively early date, to be succeeded by the great Mission.

I believe that Ellis is correct. His hypothesis is favored by some very strong evidence. However, it is admittedly tentative, for which reason I permit myself to suggest an even more tentative reconstruction based on the following points. Benavides, in the 1630's, speaks highly of the Pecos church, but in the ranking of missions (Zárate Salmerón relacion of 1626, Scholes 1929:45-58) it is merely called "very good," although others are classed as "very fine," "most handsome," "splendid," etc. In the same list, several missions are said to possess conventos, but Pecos is not. On the other hand, Fray Domingo Cardoso, addressing the officials of the Hacienda in Mexico City on the status of missions in 1663-66, states (idem:51, 52) that Pecos did have a convento. But so, according to him, did all other Pueblos. His report smacks to me strongly of propaganda. In this connection, Kubler (1940:85) was mistaken in implying that Pecos, in 1663, possessed a convento, as the one to which he refers was actually in Santa Fe (Hackett 1937:247). The lack of a convento and the somewhat slighting mention of the Pecos church might both apply to the "Lost" structure. Furthermore, the burials at length, certainly the latest lot of interments in the Pecos middens, might have been made during the occupancy of the "Lost" church, which had no cemetery.

Thus, one might believe that the "Lost" church was occupied until 1680, when it was razed by the Indians themselves, and that the "Old"

church was built after de Vargas' return, being used while the great mission was in course of construction. I admit, though, that it is hard to ignore the lack of any Spanish objects in or about the "Lost" church. Another point is that in Cruzate's 1689 grant of land to Pecos, the mission is spoken of as to the south of the pueblo (Bandelier 1881), which the "Lost" church certainly was not. But Cruzate, who was never at Pecos, might have misunderstood or been misinformed. Also, Father José Amanda Niel said in 1705 or 1710 that the Pecos church was sacked by the Tanos (*idem*: 121) and Vetancurt holds that it was burned (Kubler 1950: 85). Ellis and Stubbs determined definitely that the "Lost" church had not been put to the torch; nor had the great Mission, as was proved equally surely by Nusbaum in 1915. So if any church was burned, it must have been the "Old" structure. Its walls, thanks to Dominguez, could still be found without a great deal of digging. This would settle the question.

Vetancurt's statement that the Pecos church--whichever of the three it was--had been despoiled by the Tano in 1680, I have always strongly doubted. There is no evidence that there was enmity between the two people at that time and if there was looting, I cannot but believe that the Pecos would have done it themselves.

To return to the "Lost" church, I had assumed, until the fresh adobes in its unfinished sacristy were found, and Spanish remains were not found, that the structure was in use until 1680. And at times, if I have not recently read Stubbs and Ellis, I still do. Why? Because there can be no question that Kiva 7's second floor was paved with "Lost" church adobes. The first floor, it will be remembered, had been heavily burned. My idea was that this was incendiary, taking place during the months shortly before 1680 when the clergy were doing their utmost to overcome "superstitious" rites. Most unfortunately, sherds to date the Kiva 7 fire or the subsequent laying of its adobe pavement were not recovered. But these unmistakable adobes may yet be dated by further work in the South Pueblo, where Stubbs, as has been said, found that they had been used in at least one room.

One final paragraph, and a most important one, as to this troublesome matter. It is a quotation from a letter of the eminent Franciscan historian, Fray Angelico Chavez, written me in April, 1956, before the excavation of the "Lost" church had been made. He says: "Not being an archaeologist, and unable to travel at leisure because of my parish duties, I don't see how I could resolve your Pecos problem. But from this distance a very probable solution presents itself. I would say that the Bandelier foundations are those of the pre-Revolt church. The 'old church' included by Dominguez in the whole existing plant of 1776 could well be a temporary church erected immediately after the Reconquest. Fray Carlos Delgado, whose name Dominguez found on the big church's ceiling, was at Pecos in 1715, at the earliest. I cannot imagine the Padres administering the large pueblo of Pecos without some sort of church for more than 20 years after the Reconquest, 1693-1715. Upon completing the big church,

Fray Carlos could well have incorporated this temporary structure with the new convento, instead of hauling it down."

On rereading that I find myself swinging back to the late 1680 date. What, of course, is needed is careful excavation of the "Old" church walls and other parts of the convento.

APPENDIX IV

Ceremonial Pottery from Kiva 7

The little vessels from the Kiva 7 niche (Fig. 65b) have been examined by Stanley A. Stubbs, who reports (letter of Jan. 31, 1956) as follows: "No. 1 (left to right and down) - Micaceous plain (unnamed type), sand and mica temper, reddish, no slip. 2 - Polished plain (unnamed type), mica temper. 3 - Biscuit B, tuff temper. 4 - Glaze VI, sand and sandstone temper. 5 - Glaze VI, sand temper. 6 - Wiyo Black-on-white, tuff temper. 7 - 'Late Crackle' or Poge Black-on-white, sherd and sand temper. Not illustrated, vessel broken and fragments lost before being put in niche, unknown type, plain, sand temper. My guess would be that 4, 5, 7, and the unknown types were made at Pecos. The sand and sandstone inclusions look very much like Pecos temper. Also, from the crude finish of 1 and 2, I would guess that they were made at Pecos and not traded any great distance. Nos. 6 and 7 I assume to be holdovers from an earlier occupation."

Mr. Stubbs also writes that sets of miniature pots like those of Kiva 7 are reported from a number of Pueblos. "Twelve recently given the Laboratory of Anthropology are from San Ildefonso. They are not a set. Collected years ago, they were said to have been in an old room or barn in the village. One is of the early Kwahe'e Black-on-white ware, one Wiyo, and one or two Biscuit, the rest Tewa Polychrome." Jemez informants have told Stubbs that such little pots were used by them in sets of seven to hold water from North, South, East, West, above, below, and "here," a mixture of the other six; most excavations in the area disclose a few such small pots, but not always in sets. The heavy tubular shell bead, probably made from the columella of a conch, was in No. 4; the Conus "tinkler" in No. 5. E. L. Hewett (1930:83) was given a set of seven by Antonio Tapfa, the last surviving Rain Priest of the now extinct Pueblo of Pojoaque.

The large one-handled sipapu jar from Kiva 7 (Fig. 65a), was cracked by earth pressure, so that sherds could be examined by Stubbs. He writes: "I would call it Rowe Black-on-white. The temper is stream sand and very small fragments of crushed sandstone. The slip is characteristically poor, of the 'Late Crackle' or Rowe variety. I would date it ca. 1325, the period of general disintegration and degeneration that produced Pindi and Poge Black-on-white."

APPENDIX V

Field Methods

While we were working at Pecos, C. E. Guthe and I discussed, and with his help I partly wrote what was designed to be a manual for South-western archaeological fieldwork. Had it been completed and published at that time it might have had some value, but new methods such, for example, as air surveying and minicam photography of an excavation's progress have rendered obsolete a great deal of our then practice, both in mapping and recording. Also, materials that are now realized to be of the greatest importance, such as wood and charcoal specimens for climatological and dating purposes and organic substances for radiocarbon research were, in the teens, not known to be of value. There is accordingly little to say beyond a few words as to the system used at Pecos for keeping track of current work and its products.

The entire site was laid out by a surveyor in 50-foot squares. A zero stake was driven south of the Mission and a zero line run from it, a little east of magnetic north, through the approximate middle of the ruin to beyond its north end, a distance of 1650 feet. From this, at 50-foot intervals, were run north-south and east-west parallel lines. These produced the 50-foot squares, each of which was designated by the distances of its corner stake north of the zero stake and east or west of the zero line. Thus, the square in which lay Kiva 16 became 950-E-50; that containing Kiva 6, 1350-W-O (Fig. 20). Any point in a square was indicated in the same way, for example, the exit of Kiva 7's ventilator would be at about 1480-W-25.

Each piece of digging was assigned a progress map, a small sheet of 10-feet-to-the-inch coordinate paper on a little drawing board (one appears in Fig. 57b). This was kept at trench side. On it was outlined the extent of the day's digging, with notes on depth of deposit, location and serial number of burials encountered, etc. Every week or so, depending on the rapidity with which the excavation moved forward, these data, except the outlines of daily progress, were entered on one of a set of larger maps kept in the work shack. The small originals were filed.

In order that nothing should be thrown away before being passed upon by some staff member and to insure accurate location of such specimens as were preserved for cataloguing, we provided each workman, or each pair if two were digging close together, with two wooden canned-goods boxes and one smaller wooden or tin box. Into one of the larger boxes was put every potsherd recovered and into the other all animal bones; small specimens, whether whole or broken, were placed in the little box. At regular intervals some member of the staff went over the sherds in each pottery box, and noted on the trench or room card the wares that were coming out. Thus, tabs were kept on the general run of the pottery

Fig. 72. Field methods: a, work shack; at right, south end of southwest annex of Quadrangle; Martin Varela, foreman; b, trench-side box with skeleton bags, skeleton cards, tools, folding rule, bottle of dilute ambroid; c, trench equipment; left to right, sieve, sherd-sorting table, box for animal bones, table for heavy specimens; M. A. Kidder; d, G. C. Vaillant noting skeleton; e, block of deposit exposed on three sides, strata marked for removal; Test IX, Charles Peabody; f, deposit isolated, study of strata before marking; Test XIII, C. E. Guthe.



a



b



c



d



e



f

in each part of the digging. At quitting time, the boxes were marked with location and date, were carried to the central sorting place, where the sherds were gone over carefully (Fig. 72c), typical selections saved, as well, of course, as all apparently imported pieces. The animal bones were also taken to a sorting place where they were examined for traces of work or pathological conditions. Fragments too small or too badly rotted for identification and obviously duplicate bones of the commoner sorts (deer, buffalo, turkey) were discarded.

Each workman brought to the house his box of small specimens, which when given him had been marked with location and date. The objects were gone over, usually every evening, culls discarded, cataloguing done the following morning.

The above system took care of the ordinary run of specimens. When anything unusual turned up it was attended to by one of the staff, who decided whether it should be photographed in situ, whether it needed parifining or other special treatment. The workmen were given money prizes for unique specimens and for whole pots; this stimulated interest, made for careful digging, and also insured that a member of the staff would be called to take out such finds, as the prize was given only if the object was reported uncleared. We found it worth while to let the workman remain to watch the clearing and removal of his find. The time lost in these brief rests was more than made up for by the men's increased interest in their work.

I had promised (Kidder 1936:624) to discuss in a later paper the practical and theoretical aspects of stratigraphic excavation. Papers by Florence Ellis, Haury (particularly 1955), and others render this unnecessary. Nevertheless, I have sometimes noticed, even in recent publications, that stratitests have been made by sinking a pit, occasionally even in a midden on sloping ground, and gathering the sherds from a succession of cuts of equal width. The possibility of serious error in so blind a procedure is obvious. There is only one really safe way of testing, the slight extra cost of which is amply justified by the certainty that one is recovering material in the order of its original deposition. It also gives opportunity to discern graves or other pits that have disturbed an orderly deposition of refuse. The method consists of exposing a column on three sides (Fig. 72e), better still on four (Fig. 72f). One should mark off on the column one's cuts, to correspond to the observable trend of the midden, basing them as far as possible on actual ash or sand layers. The column should then be allowed to stand a while, for drying will often bring about changes of color that reveal strata not before distinguishable. Contrariwise, dessication may result in disappearance of strata visible when fresh. Hence the necessity of immediate marking, which may later be amplified.

Albright (1939), in a most valuable discussion of the methodology of archaeological fieldwork in the Near East calls attention to the "dangers and pitfalls" of stratigraphic research in that field.

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List of Abbreviations Used in This Bibliography

AA	American Anthropologist. Lancaster, Pa. and Menasha, Wisc.
AAA-M	American Anthropological Association, Memoirs. Lancaster, Pa. and Menasha, Wisc.
AIA-AS	Papers of the Archaeological Institute of America, American Series. Boston and Cambridge, Mass.
AIA-SAAP	Archaeological Institute of America, Papers of the School of American Archaeology. Santa Fe, New Mexico.
AIA-SARM	Archaeological Institute of America, School of American Research Monographs. Santa Fe, New Mexico.
AIA-SARP	Archaeological Institute of America, Papers of the School of American Research. Santa Fe, New Mexico.
Am Ant	American Antiquity. Menasha, Wisc. and Salt Lake City, Utah.
AMNH-AP	American Museum of Natural History, Anthropological Papers. New York, N: Y.
BAE-AR	Annual Report of the Bureau of American Ethnology. Washington, D. C.
BAE-B	Bureau of American Ethnology, Bulletin. Washington, D. C.
BML	Botanical Museum Leaflets. Harvard University. Cambridge, Mass.
CIW-CAAH	Carnegie Institution of Washington, Contributions to American Anthropology and History. Washington, D. C.
CIW-P	Carnegie Institution of Washington, Publications. Washington, D. C.
EP	El Palacio. Santa Fe, New Mexico.
FiA	Fieldiana: Anthropology. Chicago, Ill.

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- HSA Highway Salvage Archaeology. New Mexico Highway Department and Museum of New Mexico. Santa Fe, N. M.
- HSNM-PH Historical Society of New Mexico, Publications in History. Albuquerque, N. M.
- LA-TSB Archaeological Survey, Laboratory of Anthropology, Technical Series Bulletin. Santa Fe, N. M.
- MNA-B Museum of Northern Arizona Bulletin. Flagstaff, Ariz.
- NMHR New Mexico Historical Review. Santa Fe and Albuquerque, N. M.
- OSF Old Santa Fe. Santa Fe, N. M.
- PASE-P Papers of the Phillips Academy Southwestern Expedition. Yale University Press. New Haven, Conn.
- PAU-SSM Pan American Union, Washington, D. C., Department of Cultural Affairs, Social Science Section, Social Science Monographs. Washington, D. C.
- PMAAE-P Papers of the Peabody Museum of American Archaeology and Ethnology. Harvard University. Cambridge, Mass.
- SJA Southwestern Journal of Anthropology. Albuquerque, N. M.
- SMC Smithsonian Miscellaneous Collections. Washington, D. C.
- UAB-SSB University of Arizona Bulletin, Social Science Bulletin. Tucson, Ariz.
- UNMB-AS University of New Mexico Bulletin, Anthropological Series. Albuquerque, N. M.
- UNMB-MS University of New Mexico Bulletin, Monograph Series. Albuquerque, N. M.

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